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Compliments of. J. Tefft.

Draft

ELEVENTH ANNUAL REPORT

AGRICULTURAL
EXPERIMENT STATION.

JAN 11 1890

OF THE

UNIVERSITY OF ILLINOIS.

ILLINOIS STATE

Dairymen's Association,

CONVENTION AT CHAMPAIGN, ILL., DEC. 17-19, 1884.

PUBLISHED BY THE ASSOCIATION.

COMPILED AND EDITED BY R. P. MCGLINCY, SECRETARY, ELGIN, ILL.

The Twelfth Annual Meeting will be held at Belvidere, Illinois,
December 9, 10, 11, 1885.

ELGIN, ILL.:

ADVOCATE-NEWS PRINTING AND BOOK-BINDING HOUSE.
1885.

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TO HIS EXCELLENCY, R. J. OGLESBY, GOVERNOR OF ILLINOIS:

Sir: I beg leave herewith to submit for your consideration the official report of the Illinois State Dairymen's Association, containing the papers, addresses and discussions at its Eleventh Annual Meeting held at Champaign, Ill., December 17—19, 1884.

Respectfully,

R. P. MCGLINCY,

Secretary.

ELGIN, ILL., January, 1885.

OFFICERS FOR 1885.

PRESIDENT,

H. B. GURLER,
DeKalb, Ill.

VICE-PRESIDENT,

J. H. BROOMELL,
Aurora, Ill.

SECRETARY,

R. P. McGLINCY,
Elgin, Ill.

TREASURER,

J. H. WHITE,
Aurora, Ill.

DIRECTORS,

H. B. GURLER, DeKalb, Ill.

DR. JOSEPH TEFFT, Elgin, Ill.

J. H. BROOMELL, Aurora, Ill.

L. M. POTTER, La Fox, Ill.

S. K. BARTHOLOMEW, Marengo, Ill.

J. L. WITBECK, Belvidere, Ill.

C. F. MILLS, Springfield, Ill.

STANDARD QUANTITY AND QUALITY OF MILK.

QUANTITY.—Borden's standard—of eight and five-eighths pounds per gallon—is now taken and accepted as the standard for milk, not only in our own country, but in all Europe.

QUALITY.—The executive committee of the State Dairymen's Association, after many experiments carefully made, have decided that hereafter the following shall be considered by them as the standard quality of milk in Illinois: Water, 87.5; solid, 12.5—in a scale of 100 parts.

LIST OF MEMBERS FOR 1885.

ALLEN, RALPH, Delevan, Ill.
BEARD, A. A., Rantoul, Ill.
BROOMELL, J. H., Aurora, Ill.
BABB, JOHN, Champaign, Ill.
BUELL, C. C., Rock Falls, Ill.
CHESTER, E. E., Champaign, Ill.
DUNLAP, E. L., Savoy, Ill.
FORBES, C. W., Casey, Clark Co., Ill.
GURLER, H. B., DeKalb, Ill.
GILMORE, J. H., 275 State street,
Chicago, Ill.
HALL, FRANK H., Sugar Grove, Ill.
HOSTETTER, W. R., Mt. Carroll, Ill.
HILL, GEORGE W., Ass't Editor Live
Stock Journal, Chicago, Ill.
JOHNSON, B. F., Champaign, Ill.
LANGLEY, J. W., Champaign, Ill.

LESPINASSE, R., Hinsdale, Ill.
LAWRENCE, E. L., Belvidere, Ill.
MCGLINCY, R. P., Elgin, Ill.
MANN, C. E., Geneva, Ill.
MORISSEY, DAN., Champaign, Ill.
MORROW, GEO. E., Champaign, Ill.
MILLS, DR. C. H., Champaign, Ill.
PORTERFIELD, J. B., Sidney, Ill.
PRAY, N. A., Thomasburg, Ill.
ROP, T. A., Danville, Ill.
ROUGHTON, JOHN, Rantoul, Ill.
TEFFT, DR. JOSEPH, Elgin, Ill.
TENNEY, C. F., Bement, Ill.
TENNEY, V. A., Hoopston, Ill.
WILLIAMS, G. A., Rantoul, Ill.
WILLSON, D. W., Elgin, Ill.
WITBECK, J. L., Belvidere, Ill.
WHITE, J. H., Aurora, Ill.

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TRANSACTIONS
OF THE
ELEVENTH ANNUAL MEETING,
OF THE
Illinois State Dairymen's Association,
HELD AT

The Opera House, Champaign, Ill., December 17—19, 1884.

The meeting of the Illinois State Dairymen's Association was called to order at 3:00 P. M., Wednesday, December 17, 1884, by Prof. George E. Morrow, who introduced Hon. John R. Scott, Ex-President of the Illinois State Board of Agriculture, who delivered the Address of Welcome, on behalf of the citizens of Champaign.

ADDRESS OF WELCOME.

HON. JOHN R. SCOTT, CHAMPAIGN.

Gentlemen: It affords me much pleasure to extend to the Illinois Dairymen's Association a hearty welcome, and to assure you that the citizens of Champaign appreciate the honor of being permitted to entertain an organization that has rendered such important service in developing the resources of our state.

The dairy counties in the state are noted for the intelligence and thrift of their citizens. The dairyman, in the discharge of his routine of daily duties, is more frequently brought into contact with his fellow-man than the general farmer who markets his grain and live stock at long intervals. The dairyman harvests and generally markets his crop daily, and with much less labor than the grain-grower or the farmer engaged in mixed husbandry. The time for recreation and mental improvement at the command of the dairy farmer gives him many advantages in this respect over the general farmer,

and largely accounts for the culture and wealth of a majority of those engaged in this specialty.

Years ago, when the farmers of Ohio began to turn their attention to the production of butter and cheese, there was an alarm sounded in the dairy counties of New York, and overproduction was predicted. Later, the farmers in portions of Indiana and Illinois, with high-priced lands, became convinced that competition with farmers in the state to the westward in the production of grain and meat would compel a change in the methods of farming; and thus the boundary of the dairy district has extended until Iowa and other states to the west are noted for the extent and quality of their dairy products.

Your meeting at this point, we trust, will induce the farmers of Central Illinois to investigate the subject of dairy farming, and result in extending southward the dairy section of this state.

The farmers of Central Illinois have many advantages in the way of soil, climate and access to markets, and will be able to successfully compete with the dairy farmers to the westward; and they need not anticipate much trouble from eastern dairymen if care is taken to provide the market with a superior article of butter and cheese.

I much regret the absence of our mayor, who was appointed to deliver the address of welcome, and can only partially express for him the pleasure that it gives the citizens of Champaign and surrounding country to give you a cordial and hearty welcome to our homes.

RESPONSE.

BY R. P. M'GLINCY, ELGIN, ILL.

Mr. Chairman, Gentlemen and Citizens of Champaign:—On behalf of the Illinois State Dairymen's Association I desire to accept for them your fraternal greeting and hearty welcome, which has been accorded to this Association by your representative. I do not suppose that it would be necessary for me to add another word by way of accepting the welcome that you desire to have extended to us on this occasion; I might close my remarks here, and take my seat, and you would accept what I might say and be satisfied, but I apprehend if I would do that, you would think that the response had not been cordial, had not come from the heart and did not express our feelings in regard to the manner in which we have been received.

But let me assure you that though my words may be feeble, and I may not be able to make myself fully understood, let me say that I fully appreciate the warm sentiments expressed by your representative and accept the same on the terms in which they have been offered to us.

The Illinois State Dairymen's Association, as some of you perhaps are aware, has been in existence about eleven years. We have in that time endeavored to educate the dairy as well as the general farmer so that he might better his condition, financially, morally, socially and religiously, and in every other possible way, because as an educating institution we hold that the Association by reason of its annual meetings, has been enabled to point out the better way for these farmers, not alone in our own immediate sec-

tion, but outside of the dairy belt of the state; and with that belief we come down here with a programme prepared for the occasion, and we expect to present to you a programme of such a variety of interest that we cannot fail to please, if we do not altogether satisfy whatever you might desire in that direction; and let me say that while it is in a measure an educational institution, it can be made more so if each one of you will assist in undertaking by reason of questioning the parties who may be upon the floor at any time, and draw out from them their modes and methods of doing this business and thereby receive from them a benefit which you could not receive if you simply listened to their papers.

As an educational institution we come before you, as an institution which has for its aim and object the bettering of the condition of the dairyman as well as the farmer and the stock raiser and all branches of agriculture.

We desire to arrange our programme so that we may present new ideas, a new line upon which you may work, and in doing this we hope we may be able to satisfy you, and if it should be our fortune to meet with you again that we may learn from you, of your experience, and of the results that have attended your gathering here. Now, I hold that every individual in the room can assist in this matter if he will.

I might stand here and talk to you for an hour; we might arrange a programme which would be complete and you gain little by it if we did not have your hearty co-operation, and I believe that we shall have it; we expect to have it by reason of our having come into this section of the country for the purpose of breaking up new ground. We want to retire from this place with the feeling at least, that we have done some good, and if we haven't done as much as we expected it will not be our fault. If there were more of the older representatives of the dairy interest here I might allude to some particulars which would be interesting to them. There are gentlemen here who have heard for years past of adulterated butter; I heard one gentleman in the room say that he did not like poor butter. No man who has ever eaten fine butter wants to eat poor or adulterated butter; and our state, the second in importance in the dairy industry in the Union, is far behind any of the other dairy states in relation to the matter of providing laws, preventing the adulteration of food products and especially butter and cheese.

Take the state of Missouri, if you please—our neighbor—they have to-day a better law preventing the adulteration of food articles than we have. Go farther south if you please, in Georgia, where they can milk the best cow they have in a two-quart pail—they have got a law there that is far ahead of us. Go into Louisiana, you will find that they, too, have been aware that their citizens have been using adulterated butter, and their health has been injured, and the pockets of their merchants have been injured, and a few of their farmers who have been making butter have been injured, and they too have passed a law which is wise in its provisions, and if we could only secure in this state a law like that we might hold up our heads and claim that we were making progress. We turn to Iowa, New York and Vermont. The New York law appears to be as good as could be framed, has been in operation a little over a year and has stood the test of the courts and been pro-

nounced constitutional; and the reports come from that great center to-day that there is very little if any adulterated butter sold in that market, whereas a year ago forty per cent. of the butter sold there was either oleomargarine or suene—bull butter or sow butter, as a gentleman said last night. Little Vermont, where almost the entire state stands upon end, has adopted a law, —the finest that has ever been adopted by any legislature—imposing a fine of \$10,000 on the manufacturer, and the wholesale dealer must secure a license, and the retailer must also have a license in order to sell this spurious product to the people. Everywhere their attention has been called to it, provision has been made to protect the health of the people and to protect the products of their farmers. But what does Illinois do? At the last session of the legislature an effort was made on behalf of the dairymen to prevent the sale of adulterated products, but our law-makers, in their wisdom such as is hardly to be found in this country, have added a clause which would allow any man who has the hardihood to do so, to come out and manufacture this spurious stuff providing he does not hesitate to swear in the courts that he did not know he was violating the law. Let us read the clause: "No person shall be convicted under any of the foregoing sections of the act if he shows to the satisfaction of the court or jury that he did not know that he was violating the provisions of the law, and could not by reasonable diligence have obtained the knowledge." Now, I affirm that if a man will wilfully counterfeit an article he can just as readily swear that he did not know he was violating the law, and consequently the law we have upon our statute book to-day is not worth a picayune because any man can violate it under that provision of the law.

But when the legislature meets I hope our efforts will be brought to bear upon that subject, so we shall secure a law which, if it does not require them to pay a tax, it will require that every ounce of adulterated butter that is put upon the market shall be labeled from the time that it is manufactured until it reaches the table of the consumer. If we can secure that, we shall be doing very well. I hardly dare hope for anything better, but I do hope that we shall secure that; and I do hope that this Association, aided by the wisdom of the people in this section and other portions of the state, will put in operation here machinery which will accomplish the end and enable the farmers who are producing milk to make a little out of it. It is a fact that in this state the law is inoperative, that anybody who desires to break this statute can do so at their own sweet will.

The merchants in the city of St. Louis tell me that they have a splendid law. They could find use for all the butter made in Illinois, yet just across the bridge tons and tons of butterine are sold, and the consequence is that good creamery butter in that city can hardly be sold for twenty-five cents per pound when it ought to be worth thirty-five cents, by reason of the immense amount of adulterated butter in that market. I ask you if such a state of affairs ought to exist in this state, where a large portion of our state is engaged in the production of milk, and whether we ought not to have a law which will give us some protection from these men who will counterfeit food articles and endanger our health thereby. And it seems to me that if the people and the legislators of this state do what they should, that we shall

have within a year a law equal to that of New York, Missouri or little Vermont. I feel that every honest citizen, every intelligent farmer in this community, will help us in the effort to secure a law that will suppress the sale of adulterated food products.

Now, it is a well known fact that a live cow cannot compete with a dead hog. It is impossible with the large manufacturers and establishments in Chicago turning out tons upon tons of this stuff daily for ten cents a pound—and it does not cost half that much—as against good butter made on the farm or in creameries. Let us look at this matter carefully, and at a proper time in this Convention let us see if we cannot produce satisfactory methods for protecting the dairy interest; refer this matter to a committee which perhaps can act with the Board of Trade committee, and let us move upon Springfield when the legislature is in session and let us see whether the farmers, dairymen and creamery men of this state can stand up in the legislative halls and secure justice for their products as against those who make and sell a counterfeit article. I believe there is intelligence enough among our legislators, if they understand this matter, to give us the assistance we desire.

Dairy farming leads to intelligence and care; where you find the dairy farm there in that house you will find intelligence. It is a business that requires intelligence; a man cannot take it up haphazard, he must be regular in his methods, using the best judgment both in the care of his stock and in the manufacture of his products, if he desires to succeed. If we could get rid of this adulterated stuff that is placed upon the markets, we would have no surplus of fine creamery butter. A little care, a little exercise of judgment, will give us a good product that will be of immense value in the land.

We return the thanks of the Association to your representative from Champaign, for the cordial manner in which we have been received, and we beg to assure you that, as you become acquainted with us, we feel that we will retire to our homes with mutual regards and kind feelings one towards another. I have only been in your place a few hours and yet I see all about me the evidence of this hospitality which has been so generously extended and of which I, at least, propose to accept as much as possible because I believe that if I can mix a little of the hospitality of Champaign county with that of Kane county I shall be the better for it, and you will not be the worse. Thank you.

ANNUAL ADDRESS OF THE PRESIDENT,

DR. JOSEPH TEFFT, ELGIN, ILL.

Members of the Illinois Dairymen's Association—Ladies and Gentlemen:—
It is with much pleasure that I am permitted to meet with you here to-day on this the eleventh annual meeting of the Illinois Dairymen's Association. I trust that at this time and place I may be permitted to congratulate the dairymen of the State on their continued prosperity. Prior to 1870 Illinois was only known to the agricultural-commercial world as one of the largest cereal producing states in the Union. This prestige she still has the honor of holding at the present time, and to this she has added within the last decade

the name of being one among the foremost dairy states of the present sisterhood of the United States.

In the spring of 1870 the idea was conceived by a few dairy farmers living near a small town of about five thousand inhabitants, in the northern part of the state, of erecting a creamery. A meeting was subsequently held, the money raised by subscription to the stock, and the creamery was built without delay and put in operation.

This was the first creamery erected and operated west of the great lakes.

Here, then, was the beginning of the great creamery system of the west, now overspreading the great northwest, and which has been the means of largely increasing the wealth of the farmers wherever adopted and judiciously operated. The town alluded to above now contains between fifteen and twenty thousand people, and is environed by a dairy farming country where the mother of the Bovine family holds sway, as well as a portion of the purse string of the thrifty farmer, which she only unlooses upon receiving good shelter from the cold, bleak winds and storms of winter, together with good, kind, humane treatment from day to day.

She, by her fine lacteal flow, has contributed her might to raise means to lift the farm mortgages wherever existing in her district, to build, paint and put in repair a good farm residence for her master, and lastly, although by no means least, to build for herself a nice cow parlor (if I may be allowed the expression in contradistinction to the old hovel of years by gone), in some part of the spacious barn recently erected on the premises, where she may ruminate and repose during the long winter nights annually expected in this latitude. She has dispensed with the beautiful yet slender milkmaid, with pint cup in hand, as of yore, and called to her side the stalwart man, not particularly of political notoriety in New York, but the genuine stalwart, who, with pail in hand, having a capacity of four or five gallons, which she occasionally fills to its utmost with the pure lacteal fluid at a single milking. Now it is not my purpose to misstate or try to mislead any person in regard to the dairy interests of this state, or the country at large. But when I see the following in print, it would seem to me that it calls for a passing comment.

The statistician who figured in the United States Commissioner's report of Agriculture, published in Washington, D. C., in 1883, gives the following: Thus the irrepressible statistician of the dairy convention has a field rich in possibilities for exaggeration of the products, the value and the importance generally of the dairy interest. The aggregates are sufficiently large to satisfy a reasonable ambition for "big figures," and it is proposed here to obtain a cool and deliberate judgment of the real status of this industry.

Now, my friends, let us take a careful retrospective view of the facts and figures given by this cool, deliberate gentleman at Washington. He gives the number of cows in the United States in 1880 as 12,443,120. and then goes on to give the gallons of milk sold from farms or manufactured in farm dairies, and reported in the census of farm production, in equivalent gallons of milk for 1880 as amounting to 2,893,698,520 gallons.

Now if we divide this amount of milk given by the number of cows as above, it will give us, if I mistake not, 232.6 gallons as the average yield of milk

of the cow for the year. If the figures as given for the year be divided by the number of days in the year it will give us the average yield of the cow for a day, which amounts to two and six-tenths quarts for the cows of the United States. What shall I say of the cows of Illinois? I will say that their average, figured as above, varies but little from that of the cow as given for the United States. The United States census for 1880 gives the following statistics in regard to butter and cheese: Butter made by agriculturists, 777,250,287 pounds; by creameries, 16,471,163 pounds; and by cheese and butter factories, 12,950,621 pounds; the whole aggregating 806,672,071 pounds.

The cheese made by farmers is reported to be 27,272,489 pounds; by cheese factories, 171,750,475, and that of butter and cheese factories, 44,134,866; aggregating 243,157,850 pounds.

It will require about two and three-quarter gallons of milk to make one pound of butter; this being so it would call for 2,218,348,166 gallons of milk to make the butter alone; and if we add to this the amount required for cheese, allowing one gallon for a pound of cheese, we must add for the cheese 243,157,850 gallons; thus making the sum total required for both butter and cheese, 2,463,506,046 gallons. Now if we deduct this from the amount of milk given by the Washington statistician it will leave us 330,192,474 gallons to supply all the cities in the United States in addition to the milk obtained from a few cows in the cities not enumerated by the census. The foregoing amount left after deducting that for butter and cheese, would something more than supply Chicago's lacteal cravings for the present year.

It is a well settled fact that it will not pay any dairyman to keep a cow in his dairy that does not give over two and a half quarts of milk per day on an average for the year. Such a cow is only fit for the shambles. No cow is worthy of being retained in a dairy for the purpose of making butter and cheese, or selling milk, unless she will produce at least four thousand pounds of milk annually. Such a cow will do a little more than pay her yearly expenses.

The increase of the population in the United States by birth is about 4,193,888, and that by immigration is nearly or quite 2,496,736, for the last four years. This, added to the census returns, will give us a population of 56,846,408 at the present time. Now it is computed that the inhabitants of this country consume annually about fourteen and a half pounds of butter per capita. I am led to believe that this figure is not in excess of the actual amount so consumed, as it gives only about five-eighths of an ounce to each individual per day including all used in the manufactures where that product is used. Assuming this to be correct, we will require for home consumption alone about 810,061,314 pounds. This will be about 3,384,343 pounds in excess of the amount given by the census of 1880.

It is believed that the people of this country use more butter per capita than any other nation on the face of the globe.

We touch cheese lightly, only consuming about four pounds per capita per annum.

The adulteration of human food in my judgment is one of the greatest curses that ever befell this nation, not even excepting the civil war, which placed in premature graves its hundreds of thousands. While the adultera-

tion of human food is not quite so potent as the cannon, yet it is very decisive in its results.

Why should not mankind (who are said to have been created after the image of God,) be as healthy as the animals of the farm or forest? Does the adulterated food or medicine consumed affect the health of the human family unfavorably?

For an answer to these questions I will first refer you to the asylums of the country, and secondly to our own families.

Let me ask how many perfectly healthy persons can be found in either? And why are they not enjoying that perfect health which God gave them when born into the world?

This may be the Yankee way of answering a grave question; but my object at this time of inviting your attention to this subject is to stimulate profound thought in regard to what we eat and drink. It has been reported that what is supposed to be eggs of the tape worm, together with bacteria fungi, and even trichinæ, have been found in adulterated butter. When we come to know that the tape-worm found in the human family may and frequently does come from uncooked or rare cooked beef, and trichinæ from pork similarly used, and that bacteria and fungi may be found in both, and that the oil or fat of these animals is used for the purpose of adulterating butter without first being thoroughly cooked, can we have much good reason to doubt as to the danger of using a compound thus made?

Cheese is or has been adulterated with hog's lard. It should never be made or handled by any person who has the fear of God before his eyes, or the love of the human family in his heart.

We clip the following from the *Chicago Journal* of September 17, 1884, which goes to show to a certain extent the traffic in adulterated butter in only one city of our country, and that is not Chicago either:

"The United States Commissioner of Agriculture has presented to the British Minister at Washington a report, in which, it is stated, regarding the butter of New York, that out of 100,000,000 pounds sold annually in New York City between 40,000,000 and 60,000,000 pounds are bogus. Oleomargarine has, it is said, cut down the price of average butter to ten cents a pound, involving a loss of \$4,000,000 annually to the farmers."

A few years ago our legislature passed a law bearing in a measure upon this great evil; but in looking the law over it much reminds one of the old cow in her stanchel that has given us a full pail of luscious milk, and when we are about to rise and depart raises her foot and kicks it all into the gutter.

After going on and fixing the penalty for a violation of the law we find the following: "No person shall be convicted under any of the foregoing sections of the act, if he shows to the satisfaction of the court or jury that he did not know that he was violating the provisions of the law, and could not by reasonable diligence have obtained the knowledge."

Gov. Hamilton, in his address delivered at the Illinois Dairymen's Convention last winter, made some very pertinent remarks bearing upon the provisions of this law, well worthy the perusal of every citizen of the State.

What is such a law good for? It is worth just about as much as my old cow's pail of milk is which she kicked a few moments ago into the ditch, and

no more. Laws are made for the purpose of punishing he who deigns to counterfeit money, but they have no such tender words in them. He is followed, if needs be, by the whole police force of the government, and only finds rest from his nefarious business in the penitentiary.

The man who dares to adulterate butter, cheese or other kinds of food for human beings to eat is, in my judgment, by far a greater criminal than he who adulterates money; and why so? simply because he may put in food that which may destroy the health or happiness of an individual or family for a life time. The counterfeiting of the dollar is nowhere to be compared with that of the food, as it barely affects the pocket for a time and leaves the body sound.

Imaginary lines have been drawn dividing the state into three grand divisions. These lines are based upon the fancied or real productions of each of these sections. The most northern is known to-day as the dairy section, the middle is called the corn and cattle section, and the southern the wheat and also cattle section.

Now I consider these three divisions as nominal as a large portion of each of these sections may, and can, be made to produce nearly or quite the same kind of products as either of the others. We were told far less than a quarter of a century ago that good butter and cheese could never be made in any portion of the State of Illinois. Dairymen claim, and I have no doubt of its correctness, that where grass, corn and oats grow and mature, and good water can be obtained without serious trouble, and also where stock will thrive, that the ingenuity of man may overcome any and all other obstacles in the way of making good butter or cheese. The question has often been asked of what interest is the dairy of the north part of the state to the people of the middle or southern portion?

If I may be permitted I will here give you a few hints on this subject, and allow you to draw your own conclusions as to their value. Whatever increases the taxable property in the State or any portion thereof has a direct tendency to lessen the per cent. on the whole property of the State. First—The increase of cows and their value in Illinois during the last decade, as well as other property in connection with the dairy interests, has swelled the amount quite a little. Second—The cow of the dairy only lasts about six years on an average, and as the dairymen of the north part of the State do not raise their cows to any great extent it calls for the annual production of about 100,000 cows to keep up the dairies of the State. Therefore the supply has been largely drawn from Wisconsin, Minnesota, Iowa and Missouri, but as these States are now largely engaged in dairying themselves, and their increase will be wanted at home, therefore the dairymen of Illinois will have to look in the future elsewhere for their supply. If the middle and southern portions of the State were to turn their attention to raising such breeds of cows as are profitable for the dairy it would seem they might profit by so doing. Then again, the dairy districts do not raise cereals enough to feed the people and their stock. Large amounts of flour and bran are annually purchased in Minnesota which Illinois farmers ought to be able to furnish, and if so it would have to come from the middle or southern portions of the

State. This would give them a good home market which is the best of all markets where properly active.

It may not be wholly out of place for me to say a few words bearing upon dairy and cereal farming as compared with each other. The effect of dairy farming is to increase the value of its lands by the constant application of the animal manures annually made and spread upon the farms; whereas the cereal farms are annually depreciating in value in proportion to the amount of the draft upon the soil for the product sold, unless a goodly number of live stock are kept on such farms or they be otherwise fed. Then again the uncertainty of a good, full crop from year to year is a heavy drawback on cereal farming. While this may affect the dairy farming to some extent, it does not to that degree, as we hardly ever miss a good growth of grass, which is one of the essentials to a good dairy farm.

Then again, the marketing of the products of the two widely differ in freight as to their value. Suppose we make a few comparisons of freight on the value of the products as they are now selling in the City of New York. The estimate is made on the articles as freighted from Chicago to New York:

Butter is worth \$30 per 100 pounds, and it costs 70 cents per 100 pounds freight, leaving \$29.30 balance to shipper.

Cheese \$12.00 per 100 pounds, freight 60 cents, leaving balance of \$11.40 to shipper.

Corn 90 cents per 100 pounds, cost of freight 30 cents, leaving 61 cents to shipper.

Oats \$1.11 per 100 pounds, freight 25 cents, leaving 86 cents to shipper.

Wheat \$1.43 per 100 pounds, freight 25 cents, leaving \$1.18 to shipper.

Mess pork \$12.50 per barrel, freight 30 cents per barrel, leaving \$12.20 to shipper for 320 pounds.

By the above you will readily see you had better put your corn, oats and wheat into butter or cheese through the machine, sometimes called a cow, than to ship in bulk.

In conclusion you will please allow me to say that dairy farming is educational in its results. It necessarily brings the farmers thus engaged together, to a greater or less extent, almost every working day in the year. Here it is then that social intercourse is held between man and man; and as thought begets thought it has a direct tendency to call forth discussions on various subjects of interest which, if conducted in a friendly spirit, can but be instructive and profitable to both parties.

It is to the social gatherings and discussions of various topics bearing upon the dairy interests in conventions like the present, and the publication of the thoughts expressed, and discussions by those in attendance from year to year, that have done much in placing our dairy system where it now stands.

Education to a man about to embark in any new business is very important to success in that undertaking. As we are assembled, as it were, under the drippings of the great Agricultural College of the State of Illinois, it may be meet for me to say that I can but hope and trust that the college is giving much attention to the education of young gentlemen and ladies, and fitting them for a farm life which is the most independent as well as the most important calling in our country. Dispense with the great agricultural interest of the United States and the government would hardly survive a

twelvemonth. Then how important the education of the rising generation in a line to perpetuate this industry.

Actual and practical farm teaching is quite too much neglected in our schools generally. It used to be thought, or at least talked, by a few that book education utterly ruined a young man for a farmer. I fully believe this idea has been exploded; if not, it should be without delay. No young person can be too well posted in what is good sound education for a good dairy farmer.

To the dairymen allow me to say, educate your sons and daughters; give them good sound books to read; discard trashy fiction. Meet with them in social communion at home or with kind neighbors; make life pleasant to all as far as in you lies, and it will be the best legacy you can confer upon a generous family.

APPOINTMENT OF COMMITTEES.

ON NOMINATIONS.—J. H. White, Aurora; E. E. Chester, Champaign; D. W. Wilson, Elgin.

OBITUARY.—C. E. Mann, Geneva; C. C. Buell, Rock Falls; Dr. Mills, Champaign.

DAIRY AND FARM IMPLEMENTS.—H. M. Putnam, Champaign; Charles Ells, Champaign; H. B. Gurler, DeKalb.

RESOLUTIONS.—Prof. Frank. H. Hull, Sugar Grove; C. F. Dexter, Chicago; J. B. Porterfield, Sidney.

FINANCE.—E. L. Lawrence, Belvidere; J. R. Scott, Champaign; W. R. Hostetler, Mt. Carroll; J. L. Witbeck, Belvidere; J. H. Broomell, Aurora.

Convention adjourned to meet at 7.30 P. M.

EVENING SESSION.

Met pursuant to adjournment.

Music, Duett—Miss Kittie Baker and Mrs. Garwood.

HISTORY OF DAIRYING IN ILLINOIS.

BY HON. GEO. P. LORD, ELGIN, ILL.

Mr. President:—In preparing a history of dairying in Illinois, I have been persuaded that it was not expected that the historian should create facts, but that he should collect, arrange and present existing facts in such a light as to commend them to the confidence of the public.

While therefore he is expected to consult and familiarize himself with the official statistics of the dairy, should those statistics be found defective, or contradictory, he will be compelled to resort to other sources of information to supplement those statistics, and thereby obtain reliable data for his work.

Of one fact he must be fully conscious, and that is that the dairy must supply all the milk required:

For the daily consumption in the family;

For the manufacture of butter and cheese; and

For the growing stock.

Any statistics of the milk product of the country that does not take account of these three requirements must be defective.

I am led to make this statement from an examination of the report of the Commissioner of Agriculture for 1883, in which he attempts to show the average number of gallons of milk per cow in the different States in the Union. Take the State of Louisiana, with its 146,454 milch cows and 282,418 "other cattle," and the Commissioner makes the average product of milk to be 20 6-10 gallons per cow per annum. Now it seems to be patent to the most casual observer that with that average of milk per annum per cow, it would be impossible to supply the quantity of milk required for the support of the growing stock, leaving entirely out of the account the milk consumed in families, and that used for making butter and cheese.

It should be stated in this connection that the quantity of butter and cheese reported in this and other Southern States is very small.

Then again, the reports from the Department of Agriculture are not in harmony with each other, for in the report of the Commissioner for the year 1877, he says, "that the butter product of the United States may safely be put at 1,000,000,000 of pounds," whereas in 1883 he returns the butter product of the country at 800,000,000 of pounds.

No one, not even the Commissioner of Agriculture, supposes that the butter product of the country has fallen off twenty per cent. in six years, for these six years have been years when the price of butter has been very high, and everything has conspired to stimulate the dairy industry to produce the largest quantity of butter possible.

How, then, are we to account for these discrepancies in our official statistics? They can be accounted for only in one way—a want of uniformity in the manner of estimating the products of the dairy.

That the statistics of our agricultural products are made up largely of estimates, all will admit.

The statistics of our corn, wheat, oat and hay crops are made up of estimates.

The statistics of the dairy must be made up in the same way, for no one supposes that the milk is all measured, and the butter and cheese all weighed and reported.

The Commissioner of Agriculture in his report for 1883 says, "the milk taken as food in the farmer's family must be considered as an addition to the average given" of the annual milk product of the country.

Were it possible to fix a basis (that could be adopted by our official statistician) for estimating the daily consumption of milk in families, the average daily consumption of butter per capita, and the average quantity of milk required for the growing stock, and make our statistics conform to those estimates, there would be a uniformity in our official reports that would be truly refreshing.

We have made our estimate of the milk product of this State on the following basis, that the average consumption of milk in families is one pint per day per capita, (this being Mr. X. A. Willard's estimate, made nearly twenty years ago); that the consumption of butter of this State will be equal

to one ounce per day per capita ; and that the milk required for growing stock will amount to an average of twenty-five gallons per cow per annum.

The estimating of the dairy products on some fixed system has this advantage : Every person knows the basis on which the estimates are made, and can judge for himself whether or not that basis is correct.

While the official reports do not show the extent of this industry, they give a very creditable showing of its growth.

From the statistical table in the Commissioner of Agriculture's report in 1883, it appears that the average quantity of milk per cow per annum in Illinois in 1850 was 132.6 gallons; in 1860, 165.2 gallons; in 1870, 186.5 gallons; and in 1880, 239.7 gallons; and that the number of cows had increased from 294,671 in 1850 to 865,913 in 1880.

The dairy products have increased from 12,526,543 pounds of butter, and 1,278,225 pounds of cheese in 1850, to 60,208,972 pounds of butter and 21,253,194 pounds of cheese in 1880.

The increase in the number of cows and their average annual production of milk, as also in the quantity of the dairy products, as shown by the official reports, shows that this is a growing industry.

To arrive at any just idea of the annual extent and value of the products of this industry in Illinois, we must not only consider the quantity of milk and butter annually consumed in families, and the quantity of milk required for the growing stock, but also the quantity of milk required for the production of butter and cheese.

We estimate that it will require an average of twenty-seven pounds of milk to produce a pound of butter, and ten pounds of milk for a pound of cheese.

On the basis of our estimates the home consumption of butter for 3,077,571 population of this State will amount to 70,208,682 pounds, saying nothing about the quantity of butter sent out of the State. As the largest part of the cheese produced in the State is made in factories, the returns made by the Census Bureau are sufficiently accurate for all practical purposes.

The quantity of milk annually required to produce 70,208,682 pounds of butter and 21,253,194 pounds of cheese, will be 242,134,042 gallons; milk required for consumption for 3,077,571 population, at one pint per day per capita, 140,415,364 gallons; milk required for growing stock from 865,913 cows, estimating an average of 25 gallons per cow, 21,647,825 gallons; total annual milk product of Illinois, 404,197,231 gallons, or an average of 467 gallons of milk per cow per annum, as against an average of 239.7 gallons per cow in the report of the Commissioner of Agriculture for 1883.

In the Commissioner's report for that year he gives the average milk per cow at 239.7 gallons in Illinois, as against 401.6 in New York.

The difference between the average quantity of milk per cow between those in Illinois and those in New York was so great that I resolved to investigate it.

Calling at the office of a company having one factory in this State, and two in the best dairy districts of New York, I was informed by the gentleman having charge of the milk department that the average yield of milk per cow, and also per acre of land devoted to dairying, was larger in this State than it

was at their factories in New York. He also kindly furnished me the following statement, showing gross number of cows in dairies that supply them with milk; the average number of cows giving milk, and the quantity of milk received at their factory here, during the two years from May 1, 1882, to May 1, 1884.

As the company do not receive the Sunday morning's milk from May 1 to November 1 of each year, we add one-thirteenth to the quantity received at the factory to cover that quantity of milk produced. The company do not receive the milk from cows for the first twelve days after their coming in, and there is added for that at the rate of the daily average of milk received at the factory.

From May 1, to November 1, 1882:

Gross number of cows in dairies.....	3,319
Average number giving milk	2,630
Milk received at the factory.....	3,984,648 quarts.
Add one-thirteenth for Sunday morning's milk.	306,509 "
Add for 12 days' milk not received.....	281,931 "
Total.....	4,573,088 "

being an average of $344\frac{1}{2}$ gallons of milk per cow on the gross number of cows for six months.

From November 1, 1882. to May 1, 1883:

Gross number of cows in dairies.....	3,540
Average number giving milk	2,719
Milk received at factory	4,118,072 quarts.
Add for 12 days' milk not received.....	271,521 "
Total.....	4,379,593 "

an average for the six months of 310 gallons of milk per cow on the gross number of cows in those dairies.

From May 1, to November 1, 1883:

Gross number of cows in dairies.....	3,260
Average number giving milk.....	2,674
Milk received at factory.....	4,058,652 quarts.
Add one-thirteenth for Sunday mornings' milk.	312,204 "
Add for 12 days not received.....	286,082 "
Total.....	4,653,082 "

averaging $356\frac{1}{2}$ gallons of milk per cow on the gross number of cows in those dairies for six months.

From November 1, 1883, to May 1, 1884:

Gross number of cows in dairies.....	5,028
Average number giving milk.....	3,828
Milk received at factory.....	5,744,082 quarts.
Add for 12 days' milk not received.....	376,661 "
Total.....	6,120,743 "

an average of 304½ gallons of milk per cow on the gross number of cows for six months.

The average for the two years was 657½ gallons per cow on the gross number of cows in the dairies of those furnishing that company with milk. It will be noticed that the average time of the cows giving milk was a few days over nine months each.

And here it is proper to state that the quantity of milk consumed in the families of the dairymen supplying that factory with milk should be added to the quantity reported, and so the products of those dairies would be increased by that amount. Nor should any portion of this milk be credited to the cow standing by the pump, for the company daily test the quality of the milk received by them, and a memorandum of the quality as well as the quantity is set opposite every man's name, and I am safe in saying that for quality as well as quantity this record cannot be excelled in any section of the country.

And here I would say that all that is intended by this tabulated statement is that it shows the possibilities of the dairy, and that the patrons of that company have learned how to avail themselves of these possibilities.

In order to ascertain the amount of capital invested in the dairy industry of this State, we estimate that it will require an average of four acres of improved land to supply the animals with food, and an average of a span of horses to every twenty cows for the cultivation of the land and for marketing and distributing the milk. The improved land we value at \$50 per acre, the cows at \$35, and the horses at \$80 each.

3,460,772 acres improved land @ \$50.....	\$173,038,600
865,193 milch cows @ \$35.....	30,281,755
86,519 horses @ \$80.....	6,921,720
Wagons, harness, farm and dairy machinery, say..	4,000,000
Total capital invested.....	\$214,242,175

There are two ways of arriving at the value of the annual milk product of this state, one is the market value, or the price of milk in our leading markets, (and this is the basis of valuing other agricultural crops), the other is the value of milk for the manufacture of butter and cheese.

This value can only be ascertained by taking a given quantity of milk, and the value of the products, and deducting the cost of making butter and cheese from that value, and then ascertaining the net price per gallon for the milk.

Governor Cullom, in his address before this Association in 1882, says the milk sold was 40,153,488 gallons, value \$3,814,581, an average of 9½ cents per gallon.

Valuing the 404,197,231 gallons of milk (being the annual milk product of this State on our estimate), and we find its market value to be \$38,398,736.

While this is the basis of valuing agricultural products it does not give a just idea of the value of these products in the hands of those removed from markets.

To ascertain the value of milk for butter and cheese, we take the quantity of milk (316,636,778 pounds), delivered at the cheese and butter factories

in this State, as appears from the Commissioner of Agriculture's report for 1883, and the gross amount of money received for the butter and cheese being \$3,428,344. From this we deduct four cents per pound for making the butter, and two cents for cheese, \$666,401, leaving \$2,761,941 to be paid over to the dairymen for their milk, being an average of $7\frac{1}{2}$ cents per gallon. The value of 404,197,231 gallons of milk at $7\frac{1}{2}$ cents is \$30,314,792, which is probably a fair estimate of the annual milk product of this State.

In any estimate of the value of milk it would hardly be wise to overlook its value as an article of food.

Mr. H. A. Willard, in his work entitled "Practical Dairy Husbandry," says, "Milk is often used sparingly, under the impression that it must always be an expensive article of food, when, in fact, it is generally cheaper than any meats that can be had in the market. Were its nutritive value, as compared with beef, more fully understood, it would be more largely consumed as a matter of economy."

He further says that, "if a pound of beef, exclusive of bone, is worth twenty cents, milk should be counted a little over thirteen cents per quart, the exact figures being thirteen and one-third cents."

While milk is regarded by all as a necessary and valuable article of food, how few realize that one gallon of milk will afford an amount of nutrition equal to two pounds and three-quarters of boneless beef?

This fact ought to be kept before the people until the consumption of milk in all our families is largely increased.

Nor should the industrial value of this industry be overlooked.

It will require the time and labor of one man to every fifteen cows to cultivate the land devoted to dairying, and perform the labors connected with the dairy and the marketing and distribution of the milk, and if so, this industry gives employment to 58,000 men in this state.

There are some facts connected with the beginning, the growth, and the development of this industry in this state, that the dairymen should not willingly let die.

It is stated that Phineas Smith, while in California, conceived the idea of returning to Elgin for the purpose of shipping milk to Chicago.

In 1852 one might have seen him with his ox team and cart, taking his one can of milk to the depot of the Galena, now the Chicago & Northwestern railroad, to be transported over that road to Chicago.

This can of milk is believed to be the first can of milk ever shipped to Chicago by rail.

Other dairymen in Elgin thought well of Mr. Smith's enterprise, and they, too, engaged in the business of shipping milk to Chicago, and so rapidly did this department of effort increase, that in less than ten years the supply of milk was greater than the demand for it in the Chicago market, and the dairymen had to find other outlets for milk; and so it came about, that in the year 1863, Mr. I. H. Wanzer established the first cheese factory in Illinois, a little east of Elgin, thus affording the dairymen a new outlet for milk.

But these ten years were eventful ones in the development of the milk industry, for those engaged in shipping milk from Elgin, stamped upon

Elgin milk a reputation for excellence that can never be effaced. And now, after a lapse of twenty years, every milk wagon in Chicago bears the stamp of Elgin milk.

This branch of the business of dairying has kept increasing until, as appears from statistics furnished me by the officers of various railroads centering in Chicago, there was shipped to Chicago in 1883, over the

C. & N. W. R.R.....	952,902	cans of milk.
C. M. & St. P. R.R.....	272,735	“ “
C. B. & Q. R.R.....	192,737	“ “
C. & R. I. R.R.....	113,774	“ “
Illinois Central R.R.....	55,000	“ “

Total.....1,587,148 cans of milk,

Of eight gallons each, and every can of that milk, as soon as it reached the Chicago market, was made to bear the imprint (Elgin milk) of that first can of milk taken by Mr. Smith in his ox cart in 1852, and shipped to Chicago.

All honor to those noble men, who in those early days, and at the very beginning of this department of the dairy business, laid so deep and broad a foundation for the reputation of “Elgin milk,” that it has never been excelled, and to this day is regarded both by the producer and consumer as all that is required in order to give it currency in the great commercial market of the west.

It was but a few years after M. Wanzer established his cheese factory in Elgin, when a member of the legislature, publicly declared in “the house” that there was not then made in this state such a thing as a good cheese.

Why he made such a statement, or what relation that statement bore to the subject under discussion is not known.

Suffice it to say, that when the gentleman's statement was reported to the gentlemen composing the “Elgin Dairy Club,” they resolved to send the “member” a cheese made at Elgin, Illinois, by I. H. Wanzer.

The club appointed your worthy president, Doctor Tefft, a committee to select the cheese, and in due time the cheese was forwarded to Gen. A. C. Fuller, at Springfield, to be presented, with the compliments of the Elgin Dairy Club, to the “member” who had never seen a good cheese that was manufactured in Illinois.

General Fuller was faithful to the trust committed to his charge, for on a set day he publicly presented the cheese in the legislative chamber, and for once in the history of legislation in Illinois, “Crackers and Cheese” were the order of the day.

From that day forward it was officially and commercially recognized that “Hamburgh Cheese,” would meet with formidable competition in the west.

In the year 1865 Mr. Gail Borden established a factory in Elgin for condensing milk, and so the dairy industry in Illinois took a new departure. This process of treating milk is purely American, being an invention of Mr. Borden himself.

Whatever is done in this factory is systematically done, and the product is of the highest grade, and is well known in our markets, as well as in markets abroad.

Not less than 2,225,000 gallons of milk is condensed annually at this factory. In the process of condensing all the constituent parts of the milk, fat, casine, and sugar are retained, whereas in the manufacture of butter and cheese, all of the sugar, and about 25 per cent. of the casine is run off into the whey, thereby entailing a heavy loss on the dairy industry.

From official reports it appears that in 1882 there was exported \$200,490 worth of condensed milk, and in 1883, \$180,505 worth.

It would seem that there is a larger per cent. of the condensed milk exported than of either of the other dairy products. This department of the dairy industry is in its infancy, and is capable of being enlarged to almost any extent.

Probably in no other product of the dairy has there been more marked improvement than in the quality of our butter.

Turning to the report of the Commissioner of Agriculture for 1871, and we find this statement: "That Mr. I. H. Wanzer, manager of a butter and cheese factory at Elgin, Illinois, well known as a skillful dairyman, says that while Western cheese has attained a respectable standing in the market, Western butter has a very unenviable reputation." Strange as this may seem to us to-day it was then too true.

In 1877, the Commissioner says, "at one time there was a prejudice in Eastern markets against Western butter and cheese. That is rapidly disappearing and usually the creamery and factory brands of Wisconsin, Michigan, Illinois and Iowa, command quick sales at remunerative prices."

Four years later, as appears from the tabulated statement in the report of the Illinois Department of Agriculture, the sales on the Elgin Board of Trade, amounted to \$2,219,600.04; the sales of cheese were 11,327,525 pounds, and of butter, 3,868,629 pounds.

It hardly seems possible that in so short a time the dairy center of this country should be transferred to this State. And yet it is a historic fact that in all the great markets of this country the dealers in dairy products, on market days, wait for reports of transactions on the Elgin Board of Trade before making any large transactions in butter.

DISCUSSION.

PROF. MORROW: I will only take time to express my sincere regret that a gentleman of the ability of Mr. Lord has not given us the paper that I wish he would. I confess that I found myself much more interested in the facts which he gave us in regard to the early status of the dairy interest in this State than I did in the statistics. There are many of those important for us to remember, and yet I think it only fair to say that I regret what seems to be the mistaken line in which he discusses the statistics of the national department of agriculture. Mr. Dodge, the statistician of that department, ranks perhaps as the first statistician in the United States, and it seems to me that the author of that paper has fallen into an error which led him further from the accurate truth than Mr. Dodge in the first place. I do not believe; for instance, that you will find that his estimate of the average product of the cows of Illinois, as a whole, is as nearly correct as that of Mr.

Dodge, whom he criticises; and I speak of that because I find here the possible source of this confusion. In the census reports we find that the statistics of the farm products—butter, cheese and milk—are respectively entirely separate from those of the production as manufactured in the factories, whether butter or cheese, or combined; and in many cases criticisms have been placed upon the census statistics when they were expressly those of the farm products and did not include those of the manufactory. A gentleman of our own State falls into this error, in some calculations he made giving the farm product in our line without any reference whatever to the very large manufactories. I therefore regret that Mr. Lord, with his abundant opportunities and knowledge on the subject, did not give us more of the actual history of the industry which has been one of the most surprising and most interesting in our country, and which has done as much to improve the condition of the people in the northwestern portion of the State, for instance, as any one industry connected with agriculture. If he could have given us full details as to the rise and progress of the industry as applied to cheese and then as applied to butter, interesting things upon which he simply touched, and extended his remarks with reference, for instance, to the condensed milk industry beyond the little town, to which we all give credit, but which is still but one little town in Illinois, we should be pleased.

R. P. MCGLINCY: When a man indulges in figures he seems to forget the object he has in view; in this paper, Mr. Lord has presented an array of figures that is simply astounding, when you get beyond a certain number of millions of gallons of milk, it is a pretty difficult matter to comprehend such an amount. If Mr. Lord had been here in person he would doubtless have told you that in 1870 our honored President was instrumental in establishing the first creamery or butter factory west of the Lakes, that from that time twelve or fourteen years later, we find that there are 450 butter and cheese factories in the State, a large proportion of which are located in the northern part of the State. But this dairy industry has been a good thing for the northern part of the State and people outside of that are becoming interested and it is extending until it has a place in the extreme southern part of the State, and I might say, Mr. President, that it was from the most extreme southern part of the State, that the only entry of butter from the great State of Illinois, for the Exposition at New Orleans, came, from Clay County, where they are just in their A B C of dairying. Those people down there realize that this Exposition at New Orleans means business, and if I have an opportunity of going down there I propose to give that man all the premiums that belong to Illinois. If Mr. Lord had been here he would have opened up for your benefit a large fund of information; he would have shown these people that while they may not be directly engaged in dairying, they can be engaged in raising grain and cows to supply the northern part of the State. He would have shown also, the course necessary to make this industry a profitable one. He would have given you an idea of the markets, not only our own local markets but abroad. In fact I think he would have covered the field so fully that there would have been no question raised as to any lack of information in regard to the subject he was handling.

MR. J. H. WHITE: Mr. President, Col. McGlinchy failed to state one or

two things with reference to this matter. This gentleman, Mr. Lord, is a Kane County man. Another point, speaking of the name of Elgin butter, we find in the market reports from New York and other centers, Elgin butter is quoted in the winter season, almost invariably at one to three cents above eastern butter, and I see they state in connection with that, that everything that is sold on the Elgin Board of Trade is designated as Elgin butter.

THE PRESIDENT: I think I understood Mr. Morrow, to say that he thought this account of milk given in the report at Washington was correct. I should beg to differ very much from him in that respect. I think that if he figures it down carefully he will find that a cow averages according to this report about 2 6-10 quarts of milk per day. Now a cow that don't give more than that is good for nothing but the shambles. It was because of that report that I said what I did in my paper; I thought it was doing wrong to the country generally to report that our cows didn't give over 2 6-10 quarts of milk a day.

J. R. SCOTT: Unless I misapprehended this gentleman's figures it seems to me they came very far short of what they ought to be. I think he made the statement for instance, that twenty five quarts of milk per cow was all that was necessary to raise the calves. I want to say if that is the basis of his statement, I think he is about as far wide of the facts as the Commissioner is as to what a cow will produce, because twenty-five quarts of milk will not keep a calf very long.

MR. WHITE: I presume in making that statement he remembers that a very large proportion of our calves in the dairy district are never fed at all, but slaughtered at birth.

MR. HOSTETTER: When these estimates are made, don't they take the amount of milk and butter sold and reported as the average instead of what is not reported. There is a great deal of butter that is not reported sold, for instance, my butter is not reported sold, like the butter on the Elgin Board of Trade. What goes to provide farmers and hotels is not reported in the general statistics of the country. They don't come in at all and that reduces the average of each cow very much.

THE PRESIDENT: The census report gives over 777,000,000 of butter that is made, and that is calculated to take in all made on farms.

DR. MILLS: I want to speak of Borden's condensed milk, I used to be in the army and we used it with the army, and especially with the sick, way down as far as Atlanta and it was perfectly safe, good and sweet. I do not know why milk is not more used in our families. I regard it as the cheapest food one can use. You can buy two quarts for six cents and I know of nothing at the same price, in which there is so much nutriment. Another thing, somebody made the remark a number of years ago, that he thought the number of cows kept in a State was an indication of the civilization, that if 500 cows were kept in one country, and in another of equal area 400 were kept, in the one keeping 500 there was the more civilization.

THE PRESIDENT: Mr. Lord made his figures as to the number of cows as per the census, which is 865,000. Now that census was taken in 1880. Today there are a million cows in the state, and I make the amount of property in dairying, in Illinois, \$266,636,797, which includes:

412 creameries and cheese factories and fixtures	\$ 1,236,000
One million cows, at \$35 a head.....	35,000,000
Four and-a-half acres of land to a cow to support her, at \$50 an acre.....	225,000,000
4,163 teams, with wagons and harness, \$300 each.	1,248,900
To feed those teams, hay and 1,515,332 bush. oats ...	579,489
250,000 milk cans, at \$3.50 each.....	875,000
6,244 laborers, at \$432 per year.....	2,697,408
Making the whole estimate.....	<u>\$266,636,797</u>

MR. BROOMELL: If there be nothing more said on that subject, I would like to bring to your consideration, so that the Association may take some action upon the matter, this question of adulteration which was brought up by the secretary this afternoon.

It occurs to me, that this Association, in conjunction with the committee which was appointed by the Elgin Board of Trade on Monday last, may, in due course of time, take measures to bring an influence to bear upon the legislature of the state in this coming meeting at Springfield, to have a law passed which will be efficient in meeting the question of adulteration of butter, or anything else it is thought wise to include. I suggest as a way to get at it, that the chairman of this Convention appoint a committee of five to report to-morrow morning, having taken time to deliberate. In order to get members of a committee who will act and give it their attention, I suggest a committee of five be appointed by this convention, to co-operate with a similar committee from the Elgin Board of Trade, to bring the matter before the coming meeting of the Illinois Legislature, I make that motion. Motion seconded.

MR. MCGLINCY: It seems to me there is no question likely to be up in our whole session of such vital importance to the farming industry of this State as the question of the adulteration of food products, and especially butter; there is not another industry in the State or in the world with the amount of capital invested in it, that the figures here to-day show is invested in this; and are the farmers of Illinois going to sit down and let these fiends put upon the market a product ruinous to health, and ruinous to the pocket book, and stamping out the reputation of this Elgin or Illinois butter? And yet time and again efforts have been made in this direction, and they have proven utter failures simply because you will sit down here and "resolute" until doomsday, and you don't furnish the wherewithal to set the ball in motion. If this was for a railroad, insurance or iron interest, or any other interest, men would place their shoulders to the wheel, they would go before the legislature, and they would demand that they should get such laws as would be beneficial to them. I am opposed to passing resolutions until resolutions are followed by action that will be felt throughout the State. The people of this county, as well as other counties, can urge the members of the legislature to come up and help us in this matter. Now, if this Association will form a committee that will report to this Association, let us each and all put our shoulders to the wheel and fasten a law upon the statute books that no guilty man can escape. I am in favor of the resolution if the people will back it up when they get it through the Association. Motion

put and carried. The Chair appointed J. H. Broomell, J. L. Witbeck, Geo. E. Morrow, R. P. McGlinchey and J. R. Scott, as such committee.

Song—E. A. Kimball, accompanied by Miss Kimball.

Music, Ladies' Quartet—Mrs. Garwood, Misses Kittie Baker, Helen Maltby and Nettie Ayer.

Adjourned to 9.30 o'clock, a. m.

THURSDAY MORNING SESSION.

Met pursuant to adjournment at 9.30 a. m. next day.

PRACTICAL DAIRY FARMING.

H. B. GURLER, DE KALB, ILL.

Mr. President, Ladies and Gentlemen: I have been assigned the subject of practical dairying, and I hardly know how to handle the subject without giving my experience in the business, and perhaps a few theories. In 1869 I bought a farm and went to grain raising, but my yearly balance sheet soon cried halt! and I halted. I saw that I must turn over a new leaf. I looked over and studied the different branches of farming, beef and pork raising, wool and mutton producing, and dairying. I made a new start, with cows at the head of the list, next hogs, then sheep. After a few years I dropped the sheep business, as it did not pay as well as the cows or hogs. I commenced dairying with twenty cows, such as I could buy in my vicinity, and they were not very good ones. The first year I received \$33 per head from the cows for six months' milk taken to cheese factory, and made considerable butter after the factory closed. I patronized a factory two years, and then, there being no factory in operation in my vicinity, I made butter (or, rather, my wife did, with the help of the dog to do the churning) for several years. I learned that my dairy produced 150 lbs. of butter per cow annually, which did not leave me a satisfactory profit. I then commenced to test my individual cows for percentage of cream and weight of milk. I found the weight of milk to range from 18 to 40 lbs., and the percentage of cream to be 7 to 20 in the different cows. I afterwards got an idea that this test was not sufficiently accurate, and then I tested all my cows (forty in number at this time), by setting the milk separate, and skimming and churning separate. In this test I learned that I had cows that would only pay for the feed consumed, and that I had others that would pay a profit of \$60 per year after paying for feed. Up to this time I had worked from necessity; I felt that I must know my good and poor cows; but from this time on I took much pleasure in this work. I learned that the cow that gave 40 lbs. of milk per day did not produce as much butter as the cow that gave 18 lbs. of milk. I learned that the butter yield of my cows ranged from 8 to 20 oz. per day. I commenced to weed out my unprofitable cows, and filled their places with better ones, or with heifers from my best cows, and raised the heifer calves from them. During this time I changed from summer to winter dairying. By a few years of this work I increased the butter yield of my dairy from 150 to 266 lbs. per cow, and increased the profit above cost of feed, from \$15 to

\$45 per cow. I believe any dairyman that will commence this work will get interested in it, and he will think better of his business and better of himself. I found winter dairying more profitable than summer dairying. I would have the cows calve in September or October. Let me say here, that this work had outgrown my wife and the dog, and forced myself and a horse, and, finally, a steam engine, into service, the dairy having increased to over sixty cows.

There are a number of reasons why winter dairying is preferable to summer dairying. The cow is producing the most milk when of the greatest value. The cow will, if properly cared for in cold weather, produce more milk in the year, to calve in the fall, than she will to calve in the spring. If she calves in the spring, she will naturally want to dry off in the beginning of winter, and nature and the cold weather will beat the best feeder, and she will go dry much longer than she will if dried in the summer on pasture. If she calves in the fall, and is well fed and cared for during the winter, she will give a good flow of milk until she is put to pasture in the spring, and going dry on pasture, she will milk as long as she ought to. Last May, my cows that had been milked all winter, gave as much milk as many of the patrons cows that were fresh milkers.

A cow that has nothing but corn fodder in the field, and straw at the stack, and a straw stack for shelter in winter, is not in condition to do profitable work for two months after she goes to pasture, and she will never do as well as she would have done had she been well cared for during the winter.

We all know if we would stop to think that it requires a certain amount of food to support the system, and the profit is on what she consumes over and above what nature requires for support. Many farmers act as though they did not know this to be a fact. We should study how to grow and prepare a palatable and well-balanced feed for all our stock. Even the hog will not long thrive on an exclusive corn diet.

I am satisfied that it will pay us well to use our knowledge and judgment in preparing a food for stock, that has the right proportions of flesh and fat-forming material.

I have wandered from the subject somewhat. I was telling the advantages of winter dairying. Help can be hired at a less price in winter than in summer. It makes the least milking in summer when the labor of caring for the farm crops is crowding. It gives you an opportunity to turn the cows that you have decided to dispose of for beef at the season that class of beef sells for more than any other season in the year—namely, in April and May. I find that with heavy feeding, a cow that calves in September or October can be milked until April 1st and sold May 1st for beef. I have practiced this for several years. Some may think they cannot raise their calves in the winter, but that is not so; I have raised better calves in the winter than in the summer. They must have warm, clean quarters, as all stock must have, to thrive. I have had grade Durham calves gain two lbs. per day for a month at a time in the winter months. They were fed skim-milk, corn meal, and tame hay.

My winter feed has for several years been early-cut clover and timothy hay, with wheat bran and corn meal, one-half of each by measure. I prefer

to have the hay cut when the clover is in full blossom. I feed straw and coarse hay in racks in the yard. I find the cows will consume considerable of such feed after having all the good hay they will eat in the barn. I am now feeding shocked corn, cut with a feed cutter into one-half inch lengths; I also feed what hay the cows will eat and ten to twelve quarts of wheat bran each per day. It makes a great difference when hay is cut. To produce milk, early-cut hay is much more profitable than late-cut hay. Some farmers say it will not "spend so well." I will admit that stock will consume more of the early-cut hay, and that is the reason that it is more profitable to feed. The profit is in what an animal will consume after that which is required to support the system. Therefore the more palatable the food the more will be consumed, and the larger will be the profit on what is consumed.

From the 5th to the 10th of this month my milk shrunk from 855 lbs. to 750 lbs. I went to my farm to see what was the cause. I asked my foreman about the feed, water and care of the cows. He said he was doing all he knew how to do to keep up the yield of milk. I at last discovered the cause in a change of hay. I had been feeding the second crop of clover, and the last of it was fed the 4th of the month. The change was to the last cut of the first crop, though it was good hay. I have repeatedly had the same experience when I have changed from early-cut to late-cut hay.

See that the cows have plenty of fresh-pumped water without any ice in it. We can not afford to use corn at present price—\$10 per ton—to warm the water from freezing point to the temperature of the cow's system. See that they have salt every day.

In the Elgin section most of the butter and cheese is made in the factories from either whole milk or gathered cream. Some dairymen prefer one and some the other system. In some localities all the milk is taken to the factory, and in others the cream only is taken to the factory, leaving the milk on the farm. I believe either system is preferable to making butter unless the dairyman has plenty of help without hiring, and has conveniences and skill to make butter equal to the factory goods.

The pig can not be left out of consideration in practical dairying. We must have him to utilize the skim-milk, whey and slop. I have done considerable experimenting in feeding skim-milk to pigs, both by itself and in connection with grain foods. My experience is that 100 lbs. of skim-milk will produce $6\frac{1}{2}$ lbs. of increase live weight on pigs weighing 125 lbs. or less, and on larger hogs it will produce less. A thrifty pig weighing 40 lbs. will produce more increase in weight from the same amount of food than it ever will after.

Some dairymen say they cannot get help to milk. I have seldom had any trouble in that line. We always milk in the barn, summer and winter, and make the milking a part of the day's work. We do not work until sundown in summer, and then milk ten to fifteen cows each after supper, but we have supper and have the milking done at sundown in the long days of summer.

In breeding, always use a thoroughbred male; you cannot afford to use any other if you wish to raise your stock. Decide whether you want a butter

dairy, a milk dairy, or a dairy for raising steers, and then select your male from the line you wish to work in. I believe it is as necessary to success to have some plan to work to in farming as it is with the carpenter or the machinist.

I would say to all dairymen who have not already done so, commence testing your cows as soon as you get home. If you are selling milk, know how much each cow is producing. If you are selling cream by the gauge or inch, know how much milk each cow gives and what percentage of cream each cow's milk produces. If you are making butter, know how much butter each cow will produce per week. I will warrant you will be surprised at the result of your tests, and I know you will be interested, instructed and financially benefitted.

DISCUSSION.

C. C. BUEL: I wish that Mr. Gurler would give me an idea of what he calls early cut hay and late cut hay.

MR. GURLER: I call it early cut hay, when it is cut a little before it comes in full blossom. I know that it requires more curing, and if it was exclusively timothy, I would not cut quite so soon, but in our section it is generally more clover than timothy. Clover will make more milk and the yield per acre, per year of clover will exceed the timothy because you have two crops.

Q. How much will it exceed the timothy?

A. Fifty per cent. I have repeatedly cut five tons of hay to the acre, the two crops.

Q. How much timothy did you ever cut?

A. About 3 1-4. One crop is about the best I ever got.

Q. Wont you get twice as much clover as timothy?

A. No, fifty per cent. is not twice as much; I think I put it high enough.

Q. Is the common yield of timothy hay more than two tons per acre?

Q. Probably not, but clover on the same ground would not produce five tons, the second crop would be tolerably light.

Q. Wouldn't it produce four tons of clover on the same ground that would produce two tons of timothy and then leave your ground in much better condition for another crop?

A. Yes, clover will leave the ground in much better condition for rotating crops, but I would rather estimate it at three to two, that I am sure is not over-estimating it.

Q. Isn't it difficult to cure so green?

A. I have no trouble curing with a hay tedder. I have a crop of clover that would yield fully three tons to the acre, I cut it in the morning, start the hay tedder soon after and I have it cured so I can commence to draw the next forenoon.

Q. Just what stage of curing are you referring to?

A. I estimate the capacity of my barn, after the hay is settled in the binn I know what my barn figures up to hold of hay.

Q. It is only once in a while we have settled weather, what may be called good hay weather, until about the 4th of July, or at least the 1st of July, now, you must be cutting your hay about the 20th, or the 25th of June?

A. Yes, I had over half my hay this year on the 4th of July, let me tell you, Mr. Buell that is more theory than fact about good weather after the 4th of July, for we had the best haying weather last season in the month of June, that we had the whole summer. I had more cured in one week before the 4th, than I did in two afterwards.

Q. Do you think the second crop of clover is as good in value as the first?

A. I think it is greater, that is, if you cut it in the proper time, it is of equal value certainly.

Q. I thought that my cows liked the first crop of hay very much better than the second?

A. I never found it so, unless I let the second crop grow too long until it gets woody. I have frequently had my cows fall off in the flow of milk in changing from the second crop to the first. The second crop would be on top of the mow and be fed first of course.

Q. In what stage of dryness do you put your hay in the barn?

A. Well, I don't want the clover cured enough so that the leaves will break and drop off the stalks, neither do I want it put in green. I want it dry so it won't go through a process of fermentation and come out black.

Q. Do you want a tight barn or an open barn?

A. My barn is boarded and battened.

Q. Do you salt your hay?

A. Once in a while if we get caught with some bad weather we put on a little salt.

Q. Do you consider a ton of clover equal to a ton of timothy for feed?

A. I cannot argue as to the nutriment, but I can say there is more profit in feeding a ton of clover than of timothy, as a matter of money, and that is the point we are working for.

Q. I wish you would impress upon the minds of the people in this country that it pays to manure your meadows well?

A. My manure really all goes onto my meadows. I don't like to manure new seeding the first year, I wait till the next year. The first crop will generally grow as well as we want. I think three years is plenty long to leave the land seeded. I don't remember that I ever manured on stubble ground.

Q. What would you do to insure a good catch of seed?

A. Thorough cultivation and sowing plenty of seed; even then you might miss catching with plenty of seed, if your ground was all lumpy on the surface.

Q. At what season of the year did you sow the seed?

A. I sow in the spring with our spring crops. I have seeded with timothy in the fall and got a good crop in the next season.

Q. Do you seed your spring crops altogether?

A. Yes. I now do not sow any crops of small grain without seeding, for the reason that I don't sow any more small grain than what I need in order to get the rotation. I don't grow winter grain. The timothy that I speak of seeding in the fall, is on ground that has usually been seeded with clover in the spring and I have failed to get a stand on account of drought, or my grain lodging and smothering it. I have lost from that cause more than others.

Q. What do you think of sowed corn for cattle, thick drilled or sowed corn ?

A. My idea is that you don't want to get corn so thick, but what you get some color in the stalk, it grows white like something growing down the cellar, and there is no nutriment, it aint worth feeding. I get better results from drilling. The way I plant, I get ten or twelve kernels to the foot and I think that is as thick as it ought to be.

Q. You get considerable ears on the corn that way ?

A. I get small ears.

Q. What about sweet corn ?

A. I have used some, but I was troubled to get seed corn that would grow. I think myself that it is more nutritious or something; you get a little better results from the same amount of feed; you won't get such a yield as you will in the yellow dent.

Q. How do you fasten your cows in the stable ?

A. With stanchions. I built my barn with double stalls, and they are chained. It is more comfortable for the cows to be tied around the neck; but I could not keep them clean, they had so much liberty.

Q. My experience in tying cows in stanchions was, at the first they got tired, and in the morning going out they would lie down; but after being a little accustomed to it I could see no difference.

A. The cows are tied in the stables just like a horse, and in double stalls; they can reach the food, so there is no stretching and straining; each cow has its separate feed box.

Q. Give us an idea of the amount of food profitable to feed a cow ?

A. Well, I think it is proper to feed them all they will eat, of the proper kind of food. It is not profitable to feed them all the corn meal they will eat; make a variety, give them different kinds.

Q. Your rule would be simply to ascertain about what a cow will eat, and eat up clean ?

A. Yes; but don't get the idea that I am in favor of feeding cows all the grain feed they will eat. You will readily learn what they will make good use of. There is a great deal of difference in cows in that respect; you can tell a great deal by the droppings; the droppings of some cows will look as if they had no grain feed at all, and some will look half meal, as though they had not had half the good of it—had more than they could assimilate.

Q. I understand that you get two crops of hay a year; where do you get your summer feed ?

A. I get a good aftermath on the clover.

Q. Where do you get your winter pasture ?

A. I don't have any; the cows are in the barn, except a short time every day, long enough to have the stables cleaned.

Q. My experience has been, that no matter at what season a calf is raised, in addition to the milk ration it should have hay, instead of grass, for the first six months; it secures better digestion and less liability to scour. In raising winter calves, how long do you give them fresh milk before you change off ?

A. I never feed my calves fresh new milk until I get them learned to

drink, then I give them skimmed milk; and when I changed my new milk I would give them every twelve hours, and then twenty four, and so on, until I got them where they would drink either sweet or sour milk.

Q. Do you give grain feed?

A. Yes; I feed corn meal and wheat bran.

Q. Do you think meal is better than whole grain for calves?

A. Yes; you get more good out of it, and I think that a cow will give more milk. I have heard men argue that there is no waste in feeding a cow whole grain; that what the cow don't get the hogs do. But we can't afford to let the cows do that; there is a wear and tear on the machinery which affects the profit. I don't think it is policy. I feed my calves half skim milk until they get to grass in the spring, and the next fall they are great, noble fellows, well able to take care of themselves. The calf you raise in the summer, if it goes through the first winter has got to be taken extra care of in order to come out the next spring in good shape.

Q. In other words, your calves raised in the winter are worth nearly as much at a year and a half as calves raised in the spring are at the age of two years?

A. Yes, they are worth just as much, and I have very often thought winter calves, at six to eight months, are worth as much as spring calves at a year.

Q. I wish Dr. Tefft would give us some points on the value of corn fodder as compared with hay for beef and for milch cows?

A. I have been in the practice of using corn fodder largely in the winter for years; I prefer it. If it is cut properly, and at the proper time, your corn won't shrink much. I want them fed twice a day on the fodder, cut up about three-fourths of an inch or one inch, and once on hay. My cows will do better on that feed than on any other, and the milk is better. It should be cut as soon as it begins to glaze. In regard to fodder corn, I cut my corn about twelve inches high, not close to the ground, and set it up in shocks, cure it and have it taken into the barn. I have a tread horse-power, one horse and the "Belle City" cutter. I feed night and morning, with the corn fodder usually, and hay in the middle of the day.

Q. Do you find it necessary for cows to have water more than once a day?

A. They drink whatever they want at one turning out; do not turn them out too early in the morning and they will drink enough to last. The water I use for my cows passes through my barn under the ground and comes out on the south side, so they have a sunny place to go and drink. It is the same water that is used for cooling the milk, so it is warmed a little in winter. I have a tank in my cooling room that will hold forty barrels; I pump by wind from a well into that tank. The same water goes to my cooling tubs through pipes, and the water comes to the cooling tubs of the same temperature as the water in the well, and the cows like that. It is not as cold as the water they take out of the creeks. The inspection for the condensed milk factory is so rigid that the patrons keep their barns in a very good condition, as well as their strainers, milk cans, and everything that is handled there; they are exceedingly particular.

Q. How do you fasten your cows?

A. By stanchions; I have tried the chains, but think the stanchions best.

Q. What length of plank or floor do you use behind your stanchions?

A. When I first built I had Durham cows, and I built four feet four inches. I now have Holsteins, and grades of Holsteins, and it takes a five-foot floor; it is none too long. It wants to be just so a cow can stand comfortably on her hind feet, a little forward of the drop.

Q. How much of a drop have you?

A. My drop is four inches.

Q. Do you know how much an acre it costs you to cut and cure your fodder?

A. It costs \$1 an acre to set it up, and the husking something more. They don't bind it. I have heard it argued that it is better to feed corn in the ear, but I cannot see why. It is apt to derange the alimentary canal; it acts as an irritant as it passes through. The corn should be ground for feed because the cow don't grind it herself, and she cannot get the nutriment out of it. A horse will chew ground feed all up, but a cow will not.

Q. Do you feed meal wet or dry?

A. Dry, invariably. I prefer corn and oats ground together to any other feed; bran makes very good feed, mixed with corn and oats.

Q. What proportion of corn and oats do you grind?

A. I would grind two bushels of oats to one of corn, and I would mix just about an equal bulk in bran.

Q. Do you use coarse or fine bran?

A. I take the second put of bran, that is, the inner bran, and of course it is finer—called middlings. There is a difference in the outer and the inner coat which is distinguishable under the microscope; the outer coat is a darker color, and that comes in large flakes in the roller mill process; the inner coat contains more phosphates.

DR. MILLS: In feeding large quantities of bran, there is only one difficulty; bran is rich in mineral points, which often give rise to concretions which may endanger the life of the animal. It will often form concretions in the stomach, so called hair balls. These hair balls are only formed when the animal licks its own hair; but they can only be accumulated when there is a proper nucleus. The bran should always be mixed with corn meal and then there is little danger of trouble.

DR. TEFFT: Mr. Gurler spoke of the difficulty of keeping seed corn. That is probably because it is not properly picked and cured; and the same thing applies to field corn. If the corn is picked when it is in the stiff dough, tied up two and two and hung up; when it is dry you will have no trouble. I learned that in the factory, where they put up sweet corn. Corn that was too far advanced to put up, was thrown aside and I noticed that that invariably grew which was in full dough—in stiff dough. A friend of mine, planted some corn this spring, about as soon as the snow was off, and that corn grew.

PROF. MORROW: I want to give my most hearty approval to the position taken here, and especially commend to our friends in this part of the

State, the advantages of winter dairying. I believe that for us, even more than in northern Illinois, the winter dairying will be more profitable than summer dairying. I think there has been no summer since I have been here that butter has not sold for ten cents per pound, and there had been no winter that butter has not been at a high price. I heartily believe that you can have equally good success—and in many cases—better success in the final results in fall and winter calves, than you certainly can with late spring calves. That has been my observation. I believe that we shall find it decidedly desirable to go into winter dairying.

DR. TEFFT: I feed bran for the phosphates it contains; while you are milking your cow, you are certainly drawing phosphates from that cow, and the cow must have more supplies from some source.

DR. MILLS: I want to speak of the curing of clover. It has been a study with me to cure clover well, and put it into the barn without losing part of it. I want to tell you a little experience that I had. My man, on the farm cut a good deal of clover hay and part of it was very imperfectly cured, he did not want to spoil his part of it and he put it in the barn. I felt uneasy about that clover hay, until he came to feed it in the winter. It came out bright and sweet, not mouldy. In talking with Mr. Scott and others, I find that has been their experience in tight barns. Mr. Raymond says if you cut your clover and put it right in your barn, if your barn is tight it will come out sweet, clean and nice. I think the clover crop is corn and oats and hay practically; I think that we have nothing in the way of farm products that in any way approaches it. I would hardly recommend cutting twice. Better cut once and what the cattle don't take, will go to fertilize the land.

MR. GURLER: Do you think that you can afford to use anything as a fertilizer that our stock will consume?

DR. MILLS: Well, the cattle will finally eat up about all that is left on the ground.

MR. ALLEN: What little clover I have put in the barn green, has generally come out pretty black and rotten. I know that Mr. Scott can tell us something about this.

MR. SCOTT: I would not recommend putting clover in the barn absolutely green, but clover hay cut on a bright day, in the morning, will be kept very safely put in the barn in the evening. A brother of mine in Kentucky, raises a good deal of clover hay, and I have known him to cut his clover in the morning, and pack the mow in his big mule barn right up full of what you would call green clover and it would come out as bright, and nice for the cattle as can be, and the stock will eat very heartily of it, all they can eat. It don't do to do the same here in sheds and stacks, but if it is to be put in a tight barn free from dew or mildew, it does not need to be cured, and it comes out without any mold or black. The thing is, to put it into the barn without any water on it, if it is cut and barely wilted, cut in a bright morning and put up the same day, free from moisture, it will keep,

MR. BROOMELL: It seems to me, Mr. Scott's method of putting up his clover has the elements of the ensilage system. The two preserving elements are the exclusion of air and weight. He gets that by his tight barn and by the weight of clover packing it down.

DR. DETMERS: In Germany, they all pack their hay in good tight barns and their experience is like Mr. Scott's. If they cut their clover and get it into the barn without any rain, it will do perfectly well, if it is perfectly dry, but if you get rain on it, you must cure it before you put it into the barn, or if there is a little moisture, even a littledew, that has not been perfectly evaporated, it is dangerous, and barns have been set on fire that way. There is no fermentation taking place as in ensilage, which is really nothing but sauer kraut, and I hope that in a State where a bushel of corn is as cheap as it is in this State, that we shall not have to come to that. We can put up clover green, but it must be dry, then we have the very best hay imaginable; it comes out a little dark greenish color.

DR. TEFFT: I think that our farmers dry their hay too much. I think they lose much of the virtue; one time I had hay mowed, and put into the barn within two hours, red top hay. That hay heated so that I could not hold my hand on it, and sweat so that the water run across the barn floor. When I came to feed that hay, I supposed it would be good for nothing, but my stock ate it up cleaner than any they had had in a long time. You can put green hay into a tight barn, that you could not stack at all.

MR. GURLER: I want to hear from Mr. White about the oats lodging, and what he does for it.

MR. WHITE: This question of oats lodging, in our section has become a very serious one. We manure our lands heavily and seed often and sow small grain, with grass seed, and the rich state of our lands makes our oats grow so rank that very often we not only lose our crop of oats, but it smothers out our new seed. I was quite surprised, a few years ago, on visiting one of my neighbors, to find his cattle running through his oats the first of June; the oats eight or ten inches high, and upon inquiry, I found that he was following the practice of turning his cattle upon the oats sufficient to eat them down, keeping them back so that they headed out very much shorter. I hardly dared to try the experiment myself for sometime, but I finally ventured, and having a piece of oats that was growing very rank, I turned in forty or fifty head of them for two or three hours. They went all over it, and cropped it down close. It was so rich, and grew so fast, that in a few days they came up as rank as ever, and I repeated the process. I had a Swede man at work for me, and he said: "Mr. White, you will never get any oats," and I didn't know but what I was overdoing the thing myself, but I was very anxious, not to lose the oats and grass both. I finally got a very fine crop of oats, short enough so that we bound them nicely upon a "Marsh harvester," and a splendid stand of grass. I have done that ever since to prevent lodging, with good success.

Q. How much did that put your oat crop off?

A. That depends on the season, I would recommend to turn them in, when the oats are about six inches high and then if necessary feed again.

Q. Did you notice the quality of the milk which was produced from that feed?

A. Not quality, but I noticed the quantity.

Q. I think that if you had noticed the cream, you would have observed that it was very abundant. I think that the most abundant cream I ever had was from feed of that kind.

BUTTER AND CHEESE MAKING.

J. H. BROOMELL, AURORA.

The subject assigned by the programme to me is an old one. It has been so ably treated in its various phases, at the annual conventions from year to year, it would seem that nothing more could be said. Indeed, I have debated in my own mind what I could say to interest and instruct such an audience as the one before me. I have decided to venture upon a little review of the tendencies of the times, calling up the new experiences of manufacturers, which have come to them through the closer competition, and new machinery introduced during the past year.

It is evident that the manufacturer of butter and cheese is becoming, from year to year, more scientific; or, in other words, the scientific principles underlying the different processes are now better understood than ever before, and the tendency of the practical work of manufacturing is to get nearer and nearer to the line indicated by the work of the scientist. Manufacturers are assisted in this by the inventor who comes to them with new machinery for testing milk to ascertain its fatty qualities, and to trace adulterations; with new devices for separating the cream from the milk; with improvements in churn and butter-workers and cheese vats and presses and heating apparatus. Indeed, a man engaged in the production of these two great commodities cannot survive the close competition that presses upon him, unless he be wide awake in his business and ever on the alert for methods and devices to enable him to cut more garments out of the cloth than he has hitherto been able to do. As good wheat is essential to the production of high grade flour, so is good milk indispensable in the manufacture of fine butter and cheese. When I say good milk I mean milk the product of healthy, well fed cows; clean milk, well cooled before leaving the dairy farm, in case of transportation to a factory. With all the lecturing, talk, counsel and advice we have heard during the last fifteen years on the importance of clean, well-cooled milk, I doubt whether one half of the milk now produced in the great State of Illinois receives that attention between the cow and the manufacturers that is essential to the production of high grade goods. If this be so (and I think it is) the careful, painstaking half of the milk producers suffer a gross injustice in being loaded down with the sins of omission and commission of the other half, who are too lazy, too careless, or too indifferent to produce milk of as high grade as the problem demands.

My thought has reference, of course, to associate manufacturing, where all milk is taken at the same value. This problem of holding milk and cream up to a nearly uniform standard of excellence is still one of the most difficult with which we have to deal. Close competition between manufacturers for the control of the milk in a given district has been the chief cause of leniency which works out harmful results. Could we tighten the screws upon the careless dairymen without it resulting in the oft-repeated threat of taking his milk to some other factory equally convenient, we might accomplish much more. I see no better way to maintain a high standard of milk and cream than to keep the screws well tightened and at the same time ap-

peal to the pride and self interest of the producer to assist in a scheme which will meet out equal justice to all and produce good returns. There are but few men who cannot be reached by these two forces. Those who cannot, had better be set adrift, for they are so mean they will steal from the manufacturer or their neighbors, without a doubt. This much in general, about good milk.

The next important step of butter making is the separation of the cream from the whole body of the milk. The principle underlying the various processes for accomplishing this is well set forth by J. D. Frederickson of New York. He says: "In new milk, the butter globules are suspended in the *milk-serum*, or watery solution of the other constituents, in a mechanical mixture—an emulsion, so-called. The specific gravity of the butter globules being less than that of the *milk-serum*, the former have a tendency to rise to the surface of the latter, whenever new milk is left alone. With a small part of the *milk-serum*, the butter globules form a layer of cream on the top of the serum, leaving the latter more or less poor in fat, as skim-milk. The active agency causing the separation of the cream from the skim-milk is the difference in the respective specific gravities of the two parts. Any means increasing that difference will further the separation. By intense cooling of new milk, the serum, being the better conductor of heat, is cooled quicker than the butter globules; and as, therefore the former is shrinking more rapidly than the latter, the difference in specific gravity is increased, causing the cream to rise more quickly." All devices for raising cream, of whatever kind, were intended to take advantage of the conditions found in cows milk as stated above, although the inventors, in most cases were ignorant of them. They knew that the cooling of the milk would raise the cream but the philosophy of the process was until recently, a sealed book. While all the old inventions aimed to make the difference between the specific gravity of the cream and serum greater by the application of cold, or rather by the extraction of heat; now comes the separator and reaches the same end by centrifugal force. The difference being that the latter is vastly more powerful and will do good work where the cooling process will fail. Centrifugal force is simply another means by which to increase the tendency of the two parts of the milk to separate on account of the difference in specific gravity, but this method is a thousand times more active than cooling or heating, or any other design as yet proposed. When a particle of matter is swinging around a central point, the force by which it presses outward from the center of revolution depends upon the gravity, the speed, and the distance from the center. In other words for 1000 revolutions a minute, the distance from the center being one foot, the centrifugal force is 340 times the weight of the matter; the distance from the center being two feet it is 680 times the weight of the matter, the distance from the center being three feet it is 1020 times the weight of the matter. Now to show how this force is exerted upon cream and skim milk, suppose the weight of a particle of fat in milk be 10 weight-units and that of an equally large particle of *milk-serum* be 11 weight-units, then the force by which the fat is *naturally* driven toward the surface will be $11-10=1$, while in the centrifugal machine, making 1000 revolutions a minute, with an average radius of 1 foot, the force will be the difference between 340×10 and

340x11 which is 340. In other words, while the tendency of the cream and skim-milk to separate, while at rest would be represented by one, the force of the machine to cause a separation under the conditions mentioned would be represented by 340. The immense power of centrifugal force can be conveniently illustrated as follows: Take a stick about two feet long and suspend it upon a pivotal point in the center; attach to each end a pail containing 50 pounds of water; revolve the stick and pails 1000 revolutions per minute and each pail will pull from the center with a force of 40800 pounds or over 20 tons. Such figures show the need of constructing centrifugal machinery with great strength. Butter makers and dairymen are familiar with the difficulties of getting cream from milk at certain seasons, notably in the late fall and winter months where a large proportion of the cows are strip-pers. Mr. Fjord calls it "heavy" milk and made the phenomenon the subject of thorough investigation. Such milk refuses to part with a considerable proportion of its cream, even by intense cooling. By transportation and premature cooling, milk which originally was not "heavy" became so and many creameries were troubled to extract the cream until the introduction of the centrifugal creamer overcame the difficulty. It is not strange that a machine of the asserting power heretofore [stated should be able to waken up the "sleepy" quality of milk at any season.

Notwithstanding the revolution that is taking place in dairy countries in the methods of extracting cream, and the much that can be said in favor of the centrifugal process, I recognize that a large portion of the butter made in Illinois for some time yet must come from the older processes. Which-ever method may be practiced, it should be done in a way to secure its best results. If water cooling, the water should be the coldest that can be had, and plenty of it; if by icing, it should be thoroughly done. The latest discoveries indicate that the separation can be quickest, and most effectually accomplished, by introducing the cooling agency, whether it be ice or water, into the milk somewhere below the cream line. One invention puts it at the bottom of the tank or cooler, another just below the cream line. Experimental work with these methods has shown excellent results in a few hours. I am convinced that we have not yet reached the best method of cooling large vats of milk to extract the cream. I look for something in the near future that will eclipse all we have at present. Such an invention will combine the advantages of the icing plan without its trouble and expense and the objection of the melted ice, watering the milk.

Having extracted the cream, its treatment in preparation for the churn is more important than ever before. Separator cream must be cooled down quickly, in the summer months to the neighborhood of 50 deg. and this as soon as possible after leaving the machine. Experience shows that this *must* be done to save the grain. Some reduce it by a device allowing the cream to flow over a water cooler as it passes from the machine. I have had good results by cooling in setters in water at 49 deg. Frequent stirring is highly important to encourage equal fermentation and oxidizement. A thick crust should not be allowed to form on the cream while the lower strata are thin and unfermented. It spoils both the quality and yield of the butter. A mild, even acid in the cream is the thing to be aimed at. Bitter-

ness must be avoided. Experience shows that separator cream must be churned colder by two or three degrees than cream by the old methods. If 59 deg. to 60 deg. be the churning temperature for the one, the other must be started at 56 deg. to 57 deg. Careful watching not to overwork the butter from the new method is very essential to success in using it.

The cream when discharged from the machine must not be too thick or concentrated. The yield from the whole milk may not be affected by this error, but it increases the difficulty of extracting the butter-milk. It is quite impossible to get a clear washing of the butter. The writer was caught in a scrape of this nature last August. Early in the season the machines had been adjusted to throw about 20 per cent., or one in five, by measure, of the whole milk into the cream spout. This worked well enough during the early summer months while the milk was less rich in butter, but as the autumn approached and the milk became richer the cream became very thick, and with all the care and good management that I could command the butter was not clear. Having soon traced out what I thought was the cause of the difficulty, I changed the machines so that they would throw out 25 per cent., or one in four, of the bulk, into the cream and had no further trouble. The situation demanded a larger amount of milk-serum, or skim-milk with the cream to assist in the drawing out and washing out of the butter-milk. Operators of new machines must necessarily be learners, and what one man learns may be profitably related, to keep his neighbors out of the same mistakes.

There is a difference of judgment and practice on methods of salting. On the amount of salt, one ounce to the pound; there is no dispute. Many still apply the salt to the butter on the worker by weight, and incorporate it by light working. I like this for its accuracy, and would certainly use it with inexperienced help. Others salt in the churn and guess at the amount of salt needed, and do it successfully. Here the disadvantage lies in its inaccuracy—the liability to over-salt or under-salt. The advantage lies in being able to incorporate the salt without a preliminary working, which has considerable weight, I think, with our centrifugal butter.

As to kind of salt: the drift of the year past has been greatly in favor of domestic salts to the exclusion of imported salts. Without doubt we have American salts on the market equally as good and as pure as the best English brands, and at much less cost. The oft-repeated assertion that no fine, long-keeping qualities could be obtained in butter and cheese, without the use of some kind of foreign salt has, by experience, been thoroughly disproved. The largest number of our best butter and cheese makers are now using American salt. Foreign salt must compete in price or be discarded.

I read yet, occasionally, of some conservative individual raising his voice against artificial color in butter. Such, usually, own small dairies of Alderneys and make butter on the farm. If they allow of color at all it is only such as they can extract from carrots, supposing they are less harmful than the commonly used annattoine. Such doctrine is founded upon prejudice and not the result of intelligent investigation.

Popular taste demands a certain grade of color, and he who runs counter to this demand does it at his own loss. If color must be used, why not use

the cheapest, the most satisfactory and most harmless color yet known. I mean annettoine. Decided improvement has been made recently in the method of preparation of annettoine for butter color. I am using a simple preparation with coarse ground salt as a base—one pound of annettoine to eight pounds of salt—which gives most excellent satisfaction. It does not color the buttermilk if used in moderation, and is entirely free from the objections which attach to preparations containing oil or potash. Having been a victim of imposition from rancid oil color within two years, I regard this new departure in introducing coloring matter into butter as a happy relief from anxiety.

I shall not weary you by speaking of the A, B, C, of butter-making, supposing you are generally familiar with these details, but will try to answer any questions which may be propounded by the audience at the close of this paper, which might throw light upon this subject.

The drift of the year in cheese-making, in Illinois, has been in the direction of more good cheese and fewer poor ones. A less number of medium skims have been made this past year than for many years, and where cheese have been made the quality has been much above that of former years. I note that some full centrifugal skims have appeared, but they were so very poor and utterly worthless as human food that they took a place by themselves, and cut no figure in the general cheese trade. They will not be made hereafter at a season of the year when buttermilk cannot be used to enrich them.

A larger quantity of skim-milk has been used for stock-raising than heretofore, a use which is highly beneficial to the dairy interest of the State by aiding dairymen to replenish their herds from their own best milkers. This is a change, certainly, for the better, and I believe will be emphasized more fully the coming year.

I would observe an increase in the local consumption of cheese, owing to the fact that manufacturers have catered more to that class of trade than heretofore, which goes to prove what was said in our convention a year ago, that the consumption of cheese can be greatly increased by giving our people what they want.

It would scarcely be expected that I should enter upon the details of cheese-making in this paper, for the reason that those of my hearers who are manufacturers probably know as much about the subject as the writer, while those who are mostly ignorant of the processes can only become proficient by practical work at the cheese vat.

I would encourage the extension of cheese-making into the central and southern part of the State. There is room for more factories, and a good demand near at hand for a large part of the make. In closing I will lay before you some pointed, practical rules, which I find in a little pamphlet published by J. B. Marquis, of New York :

GENERAL RULES FOR DAIRYING.

1. Decide your line of dairying—butter, or cheese, or both.
2. Select your cows according to the line of dairying chosen.

3. Test each cow separately, and reject all not suited to your line of dairying, or that fail in quality or quantity of milk.

4. Feed liberally; have pure water always accessible, and keep a mixture of equal parts of salt, ashes and sulphur within reach of the cows.

5. Be sure your stables are well ventilated; remove all droppings promptly; freely use absorbents and deodorizers, such as saw-dust, dry earth or cut straw, not omitting a liberal use of plaster.

6. Be scrupulously clean in every particular, both in keeping the cows and in milking and handling the milk.

7. By all means avoid exposure of the milk to the hot sun, and to foul air.

8. Air and cool your milk as fast as possible down to at least 70 deg., if you carry it any distance to a factory or creamery. Do the same if you make it into cheese at home, though you need not go below 80 deg. if made up immediately.

9. When milk is kept over night to be carried to a factory, the temperature should be reduced below 60 deg.

BUTTER-MAKING.

10. If milk is set at home for cream, the sooner it can be set after milking, and the higher the temperature, the better, as cream rises best and almost wholly while the temperature is falling.

11. Never reduce the temperature below 40 deg., as a lower temperature has a tendency to chill the product and injure its keeping quality; and it also expands the water, rendering its relatively greater density less instead of increasing it. To go 5 deg. below 40 deg. would have practically the same effect as raising the temperature 5 deg., and to that extent retard the raising of the cream.

12. Skim as soon as the cream is all up, or so much of it as you wish to take from the milk.

13. Keep your cream, if not churned immediately, at a temperature of 64 deg., or below, but not below 40 deg.

14. Churn at such temperature between 55 deg. and 64 deg., as experience shows you is best. Conditions vary the temperature for churning.

15. Stop the churning when the butter is in granules about the size of wheat kernels.

16. Draw off the buttermilk and wash in clean water, before gathering the butter, until the water runs clear. If one washing is in brine, it is all the better, as brine coagulates the cheesy matter, which dissolves, and is then washed out.

17. Salt to suit customers, using none but refined salt made for dairy purposes. The best American salt is as good as any.

18. Put up in such packages as are demanded by your market.

CHEESE MAKING.

19. Milk for cheese making—whether whole, skimmed, or partly skimmed—should be perfectly sweet.

20. Set your milk at a temperature of 84 deg. or above. Rennet is most

active at 98 deg., or blood heat, above which the temperature should not be much raised. A temperature of 140 deg. will kill the rennet.

21. Add rennet enough to make a firm curd in 30 minutes.

22. Cut the curd as soon as it can be done without waste, and cut fine and finish at once.

23. Keep the temperature as evenly at 98 deg. as possible, until the curd is fit to dip and salt. Cheddar, or cook in the whey, as preferred.

24. Practice alone can teach when to dip, something depending on whether a soft or firm cheese is desired.

25. The cheesing process depends a good deal on the relative per cent of water to caseine. If there is too little water, the cheese will cure slowly and be dry, crumbly, and have little flavor. If there is too much water destructive fermentation will set in, and the cheese rapidly decay, if it does not sour and break.

26. An even temperature is indispensable for curing—as low as 65 to 70 deg. for whole milk cheese, and as high as 75 to 80 deg. for skimmed—according to the degree of richness.

CLEANLINESS.

27. It is not possible to be too particular about cleanliness. But cleanliness Gov. Seymour says, is a comparative term, and what is clean to one may be dirty to another.

28. Carefully brush the cow's udder—if it is befouled wash it—before milking.

29. Keep all hairs and loose dirt out of the milk, that no filth may be dissolved in it. No strainer can take out what is dissolved.

30. Use a fine soft cloth strainer besides the wire strainer.

31. Keep your milk away from all foul or disagreeable odors, as the fats rapidly absorb all odors, and impart them to the product.

32. Wash in tepid water every dish, implement, or utensil, that comes in contact with milk or its products. Then scald in boiling water or steam; after which rinse in cold water and expose then to pure air (and sunshine if possible) until needed for use.

MR. DEXTER: Mr. Broomell has referred to a valuable point in the use of the "centrifugal separator" as to the necessity of adding milk in the churn.

MR. BROOMELL: During the summer months 20 per cent., works successfully, but as the fall months come upon us, the milk becomes richer and we calculate it, 25 per cent of the bulk of the milk with the cream; I have not been successful in running my machine less than 20 per cent. My objection to drawing the cream thick, is, that I cannot get all the butter-milk from the butter in the churn. The emulsion is so rich in oil that it will not separate.

MR. BUELL: I think that I can help you on that. I have found by practical experience, that when the butter has just begun to form in globules, if you will put in four or five per cent of pure skim-milk, right from your separator it obviates all of that. Be sure that your skim milk is some warmer than your cream in the churn.

GENERAL FARMING IN CENTRAL ILLINOIS.

HON. E. E. CHESTER, CHAMPAIGN

Had your committee of arrangements assigned this subject, General Farming, to one more fruitful in ideas, richer in experience, and with less of human prejudice in favor of accustomed ways and usages, they would have done this audience an extreme act of kindness. Probably no class of people have a better appreciation of their own notions of propriety than the general farmer, and the few thoughts that I shall present will be from the standpoint of one who has never strayed very far from the customs of this fortieth parallel of latitude in a business way. Your committee has been kind to me, in giving a well worn subject, and confining me to the largest body of very fertile land in any of the states in our Union. I should hardly err, if I said, that this Second Judicial district of Illinois contained more acres especially adapted to the varied products of its climate than any other of equal area in the world, not excepting the newly discovered and untried interior of Africa.

The fame of the prairies of Illinois are world-wide; famous not only for this wonderful productiveness when judiciously cultivated, but for the short space of time in which they have been changed from hunting grounds to fruitful fields. Within the memory of some of my hearers, its wild and dreary stretches of prairie, broken only by belts of timber that border its streams, and the occasional hut of the frontiersman, have been superseded by well tilled farms, on which are many happy homes, enjoyed by an industrious and prosperous people, scarcely one quarter section of this but is contributing to the comfort of its owners as well as to the wealth of the nation.

Had the name given to this county of Champaign (meaning a level plain) been given to the whole of this territory, it would have been no misnomer. In fact a portion of these lands are too flat to produce abundant crops during the wet seasons, but fortunately the introduction of the use of drain tile, just at the right time, (as all the great public benefactors are introduced, at the right time) is making these the more desirable lands on account of their productiveness. Farmers of central Illinois have learned that no investment they can make pays greater dividends than money invested in draining their lands. Not only are they adding to their capital stock,—in many instances a dividend of one hundred per cent. per annum is returned them in additional crops. Too much stress cannot well be put on the importance of thoroughly draining all surface matter from our farm lands. Standing or stagnant water is a damage to all plant growth, at least to all farm crop growth. Well laid tile, of sufficient depth and size, will remove all possible damage from water, and retain the moisture in the soil from which plant growth alone receives benefit from rain-fall. If there is to be a millennial age for the tillers of the soil in which there is to be neither flood, drought or pestilence, long strides towards it are being made by the flowing of water, in the thousands of miles of artificial courses being laid as if by magic, under our farms. There is a mania with a few farmers for fast horses, for slow horses of great size, for great milking, and great grow-

ing cattle, for huge pigs, for monster sheep, for fine houses and for great barns, but the universal mania is for additional drainage. Let us hope it may continue until rainfall and the absence of rain shall cease to rob the tiller of the soil of the reward due him for his earnest labor. It may be of interest to know that Macon, McLain, Edgar and Kendall are the banner counties of the state in drainage, rating them in the order named.

If we may trust our own calculations to Assessor's returns, there was in 1883 about 23 per cent of the total acreage of farm lands in central Illinois planted to corn, producing about 28 per cent of the entire value of all the farm products of this district. The following table of the per cent of the values of the six leading products each, to total value of products of the farm, I have culled from the same returns, showing the appreciation our farmers have of these products :

Corn.....	28 per cent.
Hogs.....	14 " "
Oats.....	10 " "
Cattle.....	9 " "
Pastures.....	7 " "
Hay.....	12 " "

Or in other words 80 per cent. of our productions are meat, and meat producers, while for this same district the dairy product will not exceed 1 per cent that of the entire State being a little more than five per cent. While corn is king, hogs are the next in importance, and are a necessary adjunct on every farm, requiring but little capital to grow them, each carrying to market many pounds made from odds and ends on the farm, that without his pigship must be lost.

The State of Illinois has forty million dollars worth of cattle, consisting of nearly a million cows and one million four hundred thousand other cattle. I have not taken the trouble to compute the number that have their ownership in central Illinois, nor is it important. One thing is certain, the cattle interest is increasing with the farmers themselves. Calves that formerly went to the butcher, the feeder, or the professional stockman, now are retained on the farm, as a part of its necessary equipments. While our Elgin brothers have a high appreciation of a cow that is a deep milker, or a great butter maker, our farmers esteem more, the massive, well developed form, that will yield the greatest amount of delicious steak, or roast, the cow that gives assurance that her posterity shall be large beefy animals. Many are the invectives hurled at the little Jersey by our one ideal cattle feeders, who see no beauty in her fawn like form, and her wonderful propensity to turn all she eats into golden butter. While the tendency is to beef, yet the milking qualities of our cattle are not entirely neglected, for there is a constant inquiry for breeding stock of milking strains. Hundreds of Jerseys, Holsteins, Natives, grade and full blood Short Horns are doing nobly at the milk pail.

In enumerating the leading products of Central Illinois, I must briefly add, that the oat crop is steadily growing in importance, because of its advantage in rotation, and because farmers are being convinced of its importance as a part of the rations of their farm stock, especially the young things about the farm; that our meadows and pastures, are excelled by none, and

equalled by few other sections of the country, and that we are doing something towards making Illinois the first wheat State in the Union.

If these facts and figures show anything, they show that Central Illinois is devoted to stock growing, and the growing of feed for other live stock than their own.

Now I cannot think that this is accidental, or from the force of habit, or even example. True we are governed more by the actions of other people, than we sometimes realize. A few years ago there was a herd of White Face cattle established at Beecher, Ill. After being admired for a short time by the neighbors of their owner, more than a dozen herds were soon found in the same neighborhood. As to our system—or want of system—of farming being simply habitual, I must say, every mother's son of this generation, is supposed to be wiser than his father, and if the latter has driven in the rut, no one is more ready to pull out than the son, when he holds the lines. This age is a progressive one, and it would be unfair to infer that the agricultural portion of this, or any other community, are absolutely blind to their own interests.

While I believe the present course to be legitimate, and for the most part the proper one—subject however to some corrections and improvements—I do not believe we are making the best of all the advantages we have in climate, abundant grain crops, and rich pasturage, and excellent transportation privileges.

Notwithstanding it has been demonstrated to a certainty, that our steers in their yearling form may be made to weigh twelve-hundred pounds, and in their two year old form sixteen-hundred, and in their three year old form a ton or more: and this too with an offal of but about forty pounds to the hundred; our pigs are making a full pound per day, and two pounds per week are the accumulations of some of our mutton sheep, yet I believe that there are wastes that ought to be gathered up, profits that are as yet not considered worth the saving. Believing this, I have asked the Illinois State Dairyman's Association to come to our little city and hold their annual reunion. Knowing somewhat of their generous nature, I trust they will cheerfully do some missionary work with us, and they shall have their reward. For if he that "makes two blades of grass to grow, where but one grew before," is a benefactor, will not he also be who informs us how to make two profits, where but one was asked for, or thought of before. We did this in hopes they would tell us how we may retain the "Golden Calf" we almost worship on the farm, and not mar his form or beauty by repeated blows from the churndash, and yet send to the factory cream, the value of which is equal to the value of the aforesaid calf. How to establish and maintain factories, where the accumulated milk of a district may be converted into butter or cheese upon scientific principles, making more of it, and of a better quality, than can be made without the use of factory devices. How the labor of caring for the milk and making the butter, shall be transferred from our already overtaxed wives and daughters, to those more able. If this last is accomplished, I predict, when these people return to their homes, they will take blessings with them, blessings from much the best half of this community.

How on our farms there shall grow up families of cattle, noted for their milking as well as their beef qualities. How the products of the dairy may be sent to market in an attractive form, commanding better prices than the little pittance we now receive for our—in some instances—well sold country butter. And in fact, how we shall add to our industries, the art of taking annually coupons from our cows, that equal the original bond. Probably in no one thing is their greater loss to our farmers, than in the manner in which this matter of milk is managed. Trusting these Dairymen will fully develop this question, I will speak of one other at least.

The last quarter of a century has produced some very radical changes in the manner of making, and especially in the manner of harvesting our crops of grain and hay. To do a given amount of work, not more than one-half as many laborers are put in the field as were thirty years ago. It is claimed that with these improved implements an acre of corn can be put in the crib for less than three days' labor of one man; that a crop of wheat can be made for five dollars per acre, including seed; that hay can now be put in the mow for one dollar per ton. It would be natural to suppose that with this machinery that is doing this work faster, cheaper, and better, we could also increase the yield per acre. The fact is, with the advantages this generation has over their fathers in the use of implements to them unknown, we scarcely keep pace with them in the average of our grain crops. Nor is this to be attributed to the use of these implements, but rather to the fact that we have thought our soils were inexhaustible, and have drawn on them for indefinite amounts, regardless of deposits. It is one of the fixed laws that while one crop is growing, and the soil is being exhausted of the elements that enter most largely into that particular grain, those that enter into another variety are accumulating. Hence the necessity for *systematic* rotation of crops. Not that any of our farmers are foolhardy enough to grow any one of the crops that especially impoverishes the soil to the exclusion of all others, but that for the want of *system* we fail to get much benefit from the manner in which we simply *change* from one crop to another, as suits convenience.

It is a common thing for older heads to advise young men to decide early in life what their life occupation is to be, and then fit for it with a will. It is just as wise for young farmers to decide just what products they prefer shall bring them annual revenue, and then stick to that plan with a will, and when this is done, systematize the order in which they are to follow each other, and you have systematic rotation of crops, the benefit derived from which will depend, however, upon the crops selected and the continuance of each. This is an old theme, yet none the less important. The natural increase of our population, added to the thousands the tide of immigration is casting on our shores every year, will soon have occupied all of Uncle Sam's surplus domain, and will ere long give us a population too dense to be fed with ease, unless we cease to live only for the present. Besides, it is criminal to hand down to posterity an impoverished estate, when the present generation is none the more wealthy for this gradual impoverishment.

On credible authority I may say that not less than thirty-five per cent. in value has been added to the live stock of Illinois by the introduction of

improved stock, and by the careful, painstaking effort of many of its stockmen; and this would seem to be a very conservative estimate, when we consider that in some districts scarcely an animal can be found that does not give evidence of improved blood, and too, when we remember that neither time nor expense has been spared to bring to our State, from all the best that can be found on two continents, that is supposed at least to be in the line of improvement. Yet I fear many of us are suffering loss by not properly appreciating the value of the efforts made by the enthusiastic artist in live stock improvement. It is a loss to keep three sheep to get the clip of one; or two, to get the carcass of one. It is at a serious loss that we grow beef cattle that at three years are worth less than Herefords or Shorthorns at two, or that we content ourselves with a one-pound per day butter cow, when three is possible. The extortionate prices asked, and sometimes received, often prevents many farmers from making the improvement their better judgment indicates would be desirable.

At this present time, there is within the reach of every farmer, or stock grower, both in price and quality, better by far than the average animals of the country, because they have been made so by the skill and intelligence of experts in breeding and feeding. The same is equally true of all the grains and vegetables of the farm. I hope to live to see the day when native, or scrub, as applied to farm animals, shall not be known in the farmer's vocabulary; when every animal shall contribute its full share in supplying the wants of man, by being a model in its class, with the scrub class left out. Time forbids that I should enumerate further.

There are to the thinking, observing agriculturalist, many questions as yet not fully decided, whether profit or loss shall be the result of following a seeming plain course. The last three fat stock shows, seem to have demonstrated to a certainty, that young animals give greater gain, both per day and for feed consumed, than older ones. This is true under the high pressure plan under which all these animals are prepared for these shows, and under this system they are ripe for the shambles at an early age. The experience of many cattle men confirms the fact that an animal fed on grass, and with a cheap winter ration, will make his greatest gain the third year. The unsolved part of this question, is whether the greater profit shall be with the man who decides to push his animal to early maturity, taking his chances of producing constitutional weakness, and with it disease—as we have evidently done in swine—or with the one who prefers a cheaper and more lengthy course of bringing these animals to maturity.

Another of these questions of doubtful propriety, is the growing of articles, with which the market is already overstocked. With barely one exception, the "seven fat kine," have been devoured by "the seven lean kine," the "seven years of plenty," have been followed by "seven years of famine."

The exception is the long years the wool growers have waited for remunerative prices, waiting only to see their business destroyed by competition with foreign wools. It seems but folly for the wheat grower, to think of putting more wheat on this present overstocked market, but what will be his chagrin a few years hence, having changed to the live stock business, to hear

the great human cry "for bread," instead of as now for meat. "Out of the frying pan, into the fire."

These few, of the many examples that might be given show us plainly, the necessity of diligence on the part of agriculturists, not in their labors, for as a rule, their labors are too incessant, but in making careful observations of their farm operations, noting the same for comparison, that they may prove, not guess, at their conclusions, as to the better system of farm management, for their location and individual circumstances. That there should be more of intelligent thought, a better acquaintance with the views and operations of others, as given in the leading works on Agricultural science, and in the Agricultural press.

We believe too, there are many experiments, both of minor, and of very great importance, that can not be conducted by the average farmer, for want of both time, means, and knowledge of the use of experimental appliances, that should be conducted, by, and at the expense of the State. In this matter Illinois is behind many of her sister States.

I am fully convinced that a well fostered experimental station, besides the benefit it would be in giving information to the masses of our people, if given the *control* of one class of productions, that of the dairy, would save to that class of producers more than all its annual expenses, in giving their goods respectability in the markets.

Omitting the "Battle of the Breeds" that is being fought with such persistence, by the zealous champions of special kinds, in farm stock, as well as many other important features of this subject, for fear of trespassing on your time, I leave it to the more profitable discussion, that I trust will follow. When I say that the consideration of these subjects lead us to believe that the farmer has his labors in no small field of thought, that even the common farmer, as he is sometimes called, has need of all his capital stock in the form of general information as to farm management.

They too, lead us to believe there is a need of a wiser generation on the farm. Not that I would imply that in general education they are deficient, but if there is a special training needed for the young man who would enter one of the professions, why is there not as great need for a very special training for the young man that proposes to develop even one of the great interests of the farm. He needs more of science, a wider range of reading, and thought, to develop the sources of success, and true cause of misfortune to his business than any other living man. It matters not how intellectual a young man may be, if that mind has been stored with useful knowledge, rest assured, he can find use for all his learning on the farm.

MR. BROOMELL: Do I understand Mr. Chester to say that in the high grading, which has taken place on hogs in the last few years, the result has been to encourage disease among swine?

MR. CHESTER: That is my impression, that in the breeding for early maturity we have bred disease, and I think there is but little doubt the great swine plague has been produced that way.

Adjourned to visit the Illinois Industrial University.

THURSDAY AFTERNOON.

VISIT TO ILLINOIS INDUSTRIAL UNIVERSITY.

At two o'clock the members of the Association, in a body, paid a visit to the Illinois Industrial University, where they were kindly met by S. H. Peabody, regent, and other members of the faculty, who conducted them through all the departments of the institution and satisfactorily explained how it was conducted. There was much of interest to be seen, and especially in the workshop, where many of the students were engaged in manufacturing various implements for use in connection with the University; especially interesting was the explanation given by President Peabody, that all the machinery in the shops, including the engine, boiler, shafting, patterns, etc., was the handiwork of students. The museum, the library, the laboratory, the art studios, the societies' halls, recitation rooms, etc., were all carefully examined and approvingly discoursed upon by the members. After making the rounds of the several buildings, the members were highly entertained by President Peabody in an address wherein he recounted the work done by the University in training up boys and girls, fitting them to battle with the stern realities of life when they go out from the University.

It was an afternoon pleasantly and profitably spent, and will long be remembered and appreciated by those who visited the institution.

Met pursuant to adjournment at 7.30 P. M.

Music : Vocal solo.

The secretary read letters from the governors, as follows :

LETTERS FROM GOVERNOR HAMILTON, AND GOVERNOR-ELECT OGLESBY.

By direction of the board of directors, the secretary wrote letters to Governor Hamilton and Governor-elect Oglesby, inviting them to be present at such time during the convention as would suit their convenience. Governor Hamilton sent the following reply :

STATE OF ILLINOIS, EXECUTIVE OFFICE, }
SPRINGFIELD, December 3, 1884. }

R. P. McGlincy, Esq., Elgin, Ill.:

MY DEAR SIR: Yours of recent date, inviting me to attend the Dairymen's Convention to be held at Champaign in December, is received.

I am very sorry to say that it will be impossible for me to attend, for I expect to be in New Orleans at that time.

Very respectfully yours,

JOHN M. HAMILTON.

Governor-elect Oglesby sent the following reply :

LINCOLN, ILL., December 8, 1884.

R. P. McGlincy, Elgin, Ill.:

DEAR SIR: Your letter inviting me in the name of the directors to attend the State Dairymen's Association at Champaign, 17th and 19th inst., received.

It would afford me great pleasure to accept if I had the time at my disposal for that purpose. I regret to say I shall not be able to be present at that meeting. I hope to be able to be with you hereafter, and feel that I will be benefited by attending such meetings.

Yours very truly,

R. J. OGLESBY.

THE LIBRARY AND THE FARMER.

PROFESSOR C. E. MANN, GENEVA.

What would you do with a million dollars if you were suddenly to fall heir to it? A foolish question perhaps. But how diverse and very strange would be the answer, whether given in words or acts. Yet every child at its birth falls heir to larger and more lasting possessions and his disposition of them is quite as strange.

This world is doubtless extremely old and every generation that has left its bones upon it or within it has left also material, mental or moral acquisitions. Each generation has learned to *do* something, think something, idealize something. The men who have lived before us have learned to plow, to plant, to paint, to conceive the beautiful and then to chisel it, to think nobly and then to write and finally to print their thought. They have built ships, and houses and bridges and railroads and factories; have constructed empires and kingdoms and even republics. Some have doubtless thought they could rear their families well, manage their wives shrewdly, build their line fences and their religious and political creeds to suit themselves and their neighbors; in fact to do many intricate, valuable and perplexing things and after all very few thoughtful ones have had the hardihood to say that they have learned how *wisely* and *rightly* to *live*. So to meet this long felt want doubtless is the reason for the organization of this association and this meeting.

For ages men philosophized and theorized about the nature of another world, almost forgetting that they were in this. They debated with great warmth and supposed wisdom the character of spirit and how many angels could stand upon the point of a cambric needle, when it would seem to some of their doubtless degenerate sons they might better have discussed the use to which they should put their bodies and how large a family they could support upon the attenuated extremity of their income. One of the things most to encourage a thoughtful man as he tries to trace the progress of the world, is the fact that men are coming in all lines of thought to consider as important the homely, everyday facts of life—that cattle even need pure air and sunshine, that pigs may be made to thrive in clean pens on sweet straw; that love supposed to live on air with a little odor of rose water, will thrive best in kitchens that have proper arrangements for drainage and the slops not thrown out of the back door; that the orthodox three steps between the summer kitchen and the dining room may be safely omitted. I am pleased most firmly to believe that the thoughts of men do “widen with the process of the suns,” and yet from living for the first twenty-three years of my life under a farmer’s roof and from having since been thrown much among farmers I am forced to believe that the intelligent, shrewd and kindly care of his stock and surroundings is too often wanting when applied to his family; that he salts his cows and curries his horses oftener than he inquires after the mental and moral growth of his children, oftener than he buys a new book and sits and reads to them or hears one of them read to him as they all sit about a bonny ingle. We have no need to ask a blessing on

homes where this is a custom. They are already blessed and are showering blessings on all the homes about them.

PLAIN TALKING ABOUT FARMERS.

While I have every reason to respect the farmer, I hope to be excused if I point out what seems to me to be some of his weak points, and even suggest means of improvement. The poetical view of his occupation, is that it is in such close contact and sympathy with nature, as to lead naturally to her Author. But the practical fact seems to be, that he becomes so absorbed in securing a competence—looking after his horses, his cows, his sheep and his crops—that apparently, at least, he forgets Him who holds in His hands the winds, the seasons and the sunshine, that are to produce his income. He seems to be looking so constantly and intently *down* at the yield of his crops, that he does not think to look up at the light of the stars. Not that other classes of men do not have their peculiarities and serious faults, but we are now considering the especial characteristics—harness marks—of the farmer.

He usually seems to think that his mission is especially one of hard work, and not unfrequently feels that men of other callings do not work as hard as he does. *He* must wrench his support from the world by main force. The practical reflex of this belief is, to give his energies more completely to the physical effort of getting a living, and to make him feel, perhaps unconsciously, that the measure of a man is the amount of bodily work he can do. As his fingers are hardened by toil, too commonly his mental and moral touch become less delicate, his sympathies with the trials of others less sensitive, his appreciation of the pure, the noble, the true, less intense. Art, and music, and literature, are to him mere sentiment—stuff. In short, as his muscles become harder and more rigid, so does his character. He is so taxed physically, that he stagnates mentally; for a man with his body “fagged,” has neither the power nor the inclination to think to any purpose. —

Not unfrequently too, he comes to feel that he is made a kind of martyr to furnish luxuries to others. Softer hands and better clothes than his, awaken only bitter reflections, and as a business man, makes him suspicious of others, and not always the most pleasant man with whom to get a settlement. He thinks other men live on porterhouse, while he eats bacon. He the producer must be content with “cornbread and common doins,” while others have “wheat bread and chicken fixins.” Have my experience and observation been unfortunate, or have you, too, seen this kind of man?

Now is not this result at least unfortunate and disappointing? To be a successful farmer, must he become so engrossed? Has he no time to recall the hopes, the aspirations, the inspirations and the ideals of his early years? Has he not time for even sentiment, which I’ve no doubt, not his wife only, but he himself once thought no “stuff”?

My theme readily suggests what, to my mind, may furnish a means which if wisely used will bring about a very different and happier conclusion. In the first place, no greater mistake can be made, than for any one to give all his energies to the physical demands of his calling, whatever it may be. No man ever did succeed, or ever will, who did not by himself or proxy, first

think out his work, and then work out his thought. He cannot afford to do simply as his father or some other good man did, simply because he is *not* somebody else, and, if he succeed at all, must do it in his own way, and for the further reason that the man, or men whom he attempts to copy, did not have all the truth, and at the best were mere experimenters. This entire and foolish absorption, by a farmer or other, in the material details of his business, does seem a very high price to pay for the result obtained, and I marvel to see so many men continue it. It reminds me of an Irishman—

On the contrary, let him reserve some of his income, and a little of his energy, and take and read some of the agricultural journals, see what the most intelligent of his class are doing and thinking, and thereby be roused to thought and experiment himself. One who has felt, or even observed much of mere routine—rut farming—should know that it *pays* to investigate, to learn something of soils and fertilizers, draining, methods of tillage and harvesting. In short, to understand the principles involved, and the most approved and intelligent method of applying them. "The artist mixed his paint with brains."

In the trades and mechanic arts, there is not the imperative demand for real independent, vigorous thought and trial that there is on the farm. A very large part of those men work under the immediate direction of a foreman, made so because he does possess intelligence and special skill in his department, and he is largely to do the thinking for his men, so far as their work is concerned. But the farmer is necessarily left alone and must be laborer, foreman, superintendent, and board of directors; and if he has not the power or the inclination, to think carefully, and plan wisely he fails, although he may not get his discharge as promptly as the stupid mechanic. Successful farming is a difficult business, and like any other intricate work, to do it *well* one must *learn how*. Not every unsuccessful mechanic or tradesman can be a successful farmer. It is not yet established that every foggy doctor lacking patients, not every worn out minister, nor superannuated school-master can run a farm. Usually something is run, but it is not always the farm.

Who of your acquaintance are the really successful farmers? Aren't they the ones who read and think? He who believes otherwise, must be related to the boy John, of whom his mother averred he was a genius. He could build anything. He had made a fiddle out of his own head, and had wood enough left to make another.

The farmer, as such, needs not only agricultural journals, but books upon stock, fruits, rotation of crops, nature of soils and fertilizers. It is not a matter of sentiment or taste, but of cold dollars, of net income. Such a library, and the ability to use, is as much a necessity to the best results as his plow or his harrow: and if he can do better work than his father, it is because he *knows* more—mixes more brains with his work.

So far we have considered the necessity of reading and thought, in obtaining better material returns for labor. We have looked at it simply as a business proposition. Let us now think of it in its relation to the farmer as a husband, a father, a citizen, a man.

We all receive a large amount of instruction and polish from our asso-

ciation with our fellows. Many a man has made himself decidedly intelligent and well-informed by a prudent appropriation of the bits thus brought in his way; and especially does this association give us the smoothness of speech and manners so essential to anything like happy living with those about us. The foundryman appreciates the value of this principle when he puts his rough castings into his milling machine and rolls and tumbles them upon each other until they are cleaned and even polished. Society is a great milling machine and we are tumbled about and against each other until some of the angles of prejudice and jagged projections of our unreasoning likes and dislikes are knocked off. Now no man, can be deprived of the kind of education just referred to without material detriment and the man who has least of it should have more of some other means of getting information and refinement. The farmer is necessarily isolated and while in a moral point of view he may be the gainer, he is deprived of much of the social instruction and refining influences received by our living in a village or city. Shall he be content to suffer the resulting deterioration and even add to it by giving himself—I was about to say soul and body—to more physical labor or shall he set intelligently about finding some means of avoiding such a result?

I think he has not far to look. Next to meeting men is to read their thoughts. If he cannot hear the lecture he can read it the next morning; and this meeting of men by proxy has its advantages over the actual contact. There will be less ill-advised talk between the book and the reader, more wisdom, less froth but more wine. He will meet men only at their best. In short it seems to me there is nothing can so certainly or powerfully counteract the undesirable tendencies of the farmer's business as a good library—whether it be of ten or ten hundred volumes; and a good library is simply a part of good literature; and by good literature I do not mean poetical moonshine, rose water sentiment, a symphony of sighs nor mere historical dry bones and scientific cobblestones.

Literature is the highest thoughts of the greatest minds. It is the expressed wisdom of the wisest, the condensed shrewdness of the wittiest, the purest tones of the sweetest singers. Some one has said it is "the immortality of speech." It contains all the ascertained facts of science, the crystallized wisdom of history, the gentler and more sympathetic things of individual life in its biography, all of everyday life in its fiction, the purest thoughts of the most refined souls in its ethics, the wisdom, the glory and the inspiration from beyond the "azure arched way" in its poetry. Its field is so large that each man may find matter to his taste and it can but be that such occupation will tend more to build up true manhood and womanhood than absorption in the details of business. Not that any should ignore the practical things of the factory, the farm the parlor, or the kitchen but that they should not have entire control of existence. There are bodies to clothe, stomachs to feed, and children to care for; but there are also souls to develop and cover with white garments of truth, noble hopes to feed and thought children to nourish; and doing the latter three will lend steadiness of purpose the better to attend to the three former. An *indulged* taste for good reading gives worthy thoughts, inspires

us with a better purpose, lends weight, furnishes ballast to our craft whereby it may weather the gusts that strike it; so that we may feel, as another has said "though a wide, rough world be around us, yet it lies very low, and a wide rich heaven hangs above us though it hangs very high."

Neither is there anything incompatible between the keenest relish of the best things in literature and the right-doing of the commonest things of life. To quote one whose life exemplifies his teaching: "The dull boy, who cannot prate science, but who can drive a cart as a cart ought to be driven; or the dull girl who cannot finger a piano, but who can rightly broil a steak, is, in the eye of all true taste, a far more sightly and attractive object than the most learned good-for-nothing in the world."

The weariness of wash day, or the vexations of line fences and poor crops, will become less when mixed with the instruction and inspiration of a good book. The wearied, worried soul is soothed as by the music of heaven's far off silver bells with

"Amid the maddening maze of things,
And tossed by storm and flood,
To one fixed stake my spirit clings,
I know that God is good;
And so beside the silent sea
I wait the muffled oar,
No harm from Him can come to me
On ocean or on shore."

Or:

"Here is the sorrow, the sighing,
Here are the cloud and the night,
Here is the sickness, the dying,
There are the life and the light.
Here are the heart-strings a-tremble,
And here is the chastening rod;
There is the song and the cymbal,
And there is our Father and God."—*Alice Cary.*

One consideration, perhaps the most important, included in the value of a taste for reading, is its influence in forming, or reforming, our tastes. Our ideals of virtue, goodness, enjoyment, purest happiness, depend upon the keenness and scope of our intellectual sight, and these are largely, *very largely*, determined by our reading. Perhaps I should have said our *opportunities* for reading. Aside from our days of direct pupilage we read what pleases us, and this repeated choice deepens into the fixedness of habit, and this habitual selection we call taste, which in turn decides what our mental and moral furnishings shall be; decides whether our Sundays, our holidays, our evenings, our spare moments, shall be devoted to that which is gross and foolish, or to the elevating and the wholesome, to the stultifying re-living of business anxieties or to the absorption of elements for real growth. Neither will it be the books we read from a mere sense of duty that will affect our characters. It is only when the soul is warmed and softened by the sunshine of delight that the rosy colors of truth can be stamped lastingly

upon it. The books that affect us are the books that delight us. Happy indeed, and safe as well, is the boy or the girl, the man or the woman whose tastes lead him to spend his leisure in the innocent and ennobling companionship of good books. It is the use made of these little lulls in life that affect our character more than we think. To borrow the words of another, "In the vacancy of their hands people's thoughts will needs be busy either for better or for worse; if their minds are not dressed for the abode of the Deity they will be the workshops of the devil."

But "books teach not their own use," and it is the business of the father and the mother to furnish a wise guidance in the selection and appreciation of good books. For the parent to forget this, is to sow the seeds of future regret, and bitter disappointment. The child must be helped to see the beauty and inhale the fragrance of that which is good. He must be made to feel the invigoration and inspiration of the wise selection. This can not be done theoretically, that is by precept only. His guides must be what they would have him become. They must "allure to brighter worlds," by leading the way.

This leads one to suggest, that the kind of culture given by good literature is a wholesouled one. Mere pedantry, and learned vainglory, are as empty and hollow as the echoes from a vacant tomb. They are but the robes left by the "Shining One," after He had arisen. The best of literature purifies, refines, and elevates. We are never in danger of getting too much. It is a *little* learning that is the dangerous thing. We need not be satisfied with a Presbyterian sprinkling, but in this at least take a genuine Baptist immersion. The young man whose soul is saturated with the kindest thoughts of the best minds, is in little danger from the temptations of after life. This culture should dwell, not in the suburbs of one's affections, but be as Brutus said his Portia was to him, "as dear as the ruddy drops that visit this sad heart."

Apparently the great effort of the mass of men is to secure a competence in life. All reasonable and unreasonable means are employed to that end; and all this in the face of the fact, that if secured it must be laid aside, in a few short years at the most. Literature pursued with the same zeal, even during our leisure hours, offers an intellectual and moral competence, not only for time but, so far as we can see, for the great Beyond. It may be a continual and increasing pleasure and profit, a means of real inspiration and true growth.

If anything can build a true character it is the grand thoughts of good old books. These will keep the soul immortally young and cause the heart to whiten with the hair.

The most helpful institutions on this sin-bespattered, grief stricken earth is a real home, and anything that will lessen its drudgery, gild its plainness or enoble its common place cannot be trivial. Can anything do this as the tenderness, the forbearance, the instruction and the inspiration of the best books? Homes thus blessed give their refinement and benediction to all within them. It is characters thus developed that Bulwer says "Fine natures are like fine poems; a glance at the first two lines suffices for a guess into the beauty that waits for you if you read on." But I am re-

minded that the anticipated length of this article has already been reached, although the subject has hardly been touched; still do not let so noble a cause as that of literature suffer in your judgments by its having had a poor advocate; for I fancy that the work of the greatest geniuses here is but patch work woven from the golden fringes of truth that hang over the battlements while the great crimson-flowered web lies within to be admired by us, let us hope at some time.

With such a home atmosphere would so many farmers' sons become disgusted with farm life and drift to the city to find mediocrity or ruin, leaving disappointed and crushed hearts behind them? Those parents must be wise early and they will not blame Providence for their own neglect when it is too late. One quarter of an acre of potatoes might in twenty years have given him a library of 600 volumes; given his children a refinement and purity of soul that they do not now possess; given himself and wife a life long source of intelligent pleasure, increased, ennobled and purified their mutual affections, broadened their manhood and womanhood, kept the freshness and youth of their souls through even the decrepitude and gray hairs of age; furnished them with an honest self respect and the deserved reverence of worthy children—a benediction only true lives receive.

In the name of true economy and business success all that is noble and pure in life, will not the farmer be paid by a good library?

AGRICULTURAL EDUCATION IN THE PUBLIC SCHOOLS.

PROF. FRANK H. HALL, SUGAR GROVE, ILL.

He who says that the schools of the olden time were superior to the schools of to-day is either ignorant or pessimistic. There is a derangement in his brain or in his liver. He is misinformed, disingenuous or bilious. And lest I shall be classed with the chronic grumblers for twice venturing to criticise before this convention so beneficent and progressive an institution as our public school system, permit me at the outset to disclaim all sympathy with those antiquated croakers who forever magnify the old and distrust the new. The schools of to-day *are* more excellent than those of the boyhood time of your grandfathers. The comparison between them is as the stage-coach to the locomotive; as the sailing vessel of a hundred years ago to the magnificent floating palace that bears its passengers wrapped in luxury across the broad Atlantic in seven days.

To say that in matters of public education we have not kept even pace with the wonderful progress in material things is to slander as faithful and competent a body of men and women as ever put shoulder to the wheel in the interest of humanity.

We are not opposed to high schools, nor to what is sometimes termed "higher education in the public schools." We believe with everybody that in our public school system is public safety. We only echo that which has been repeated ten thousand times before, when we say that our free institutions can be safe only in the hands of the enlightened masses. Free education is our bulwark; the ballot in the hands of ignorance our menace.

The iron horse is a wonder. He snorts to some purpose. We all agree that his advent was the dawn of a new and glorious day in the world of material progress. But there are those who do not forget that the monster wastes more than seventy-five per cent. of the black food that goes into his fiery and capacious maw. We must fully realize this fact before we can make earnest effort to produce such improvements in the locomotive as will check his voracious appetite without in any degree reducing his strength. Indeed, you would not call the inventor of the air-brake an enemy to improved locomotion.

Our public schools are good. They are excellent. They are magnificent. They are indispensable. They are our safety, our bulwark, our glory, our pride. We honor, as did Jupiter of old, the man who is not a poet, not a lawyer, not a preacher, not a statesman, not an artist, but the teacher of all these! "Crown him, crown him!" said the father of the gods and king of men, "and give him a seat at my right hand." Our schools are a power for good that no one would wish to cripple. But may it not be true that there is some fuel wasted? That an air-brake applied to some departments of our schools might result in safer and more satisfactory mental locomotion?

I do but voice the thought of a large body of intelligent men and women when I say that there is something wrong—fundamentally wrong—in our public school system. Business men feel it; farmers feel it; teachers who have abandoned the profession, who have come up out of their books and have gone out into the busy, struggling world to meet men face to face, feel it. The press is no longer silent. Scarcely a periodical of prominence but admits to its columns unfavorable mention of modern methods of instruction or courses of study. All these critics seem to agree that there are imperfections, but as to their exact nature or the proper remedy there is a wide diversity of sentiment. One writer pleads for "half-time in schools," another for full time and compulsory attendance. The *Scientific American* speaks of the "failure of the public schools to shape their work to meet the practical wants of the multitude." Another periodical refers to the "dissatisfaction of business men with the boys from the public schools." One writer says, "we educate them (the boys) in such a way as to make them discontented with their condition." Says a New England clergyman, "Look among the high school graduates in any of our large towns, count up the half-starved clerks and would-be teachers, the lawyers without briefs, the doctors patientless, the clergymen without pulpits, and have the candor to admit that the great number of these tell the story of a pernicious public sentiment as to the courses of study in our public schools." "Is it fair," asks the editor of a farm journal, "to shape the course of study in our country schools wholly in the interests of the few who will go to the higher schools, not making any special provision for the boys who are to stay at home on the farm?" Says the Rev. Dr. E. E. Hale in a recent number of the *North American Review*: "The children educated under the new system have no experience with tools, no ability with their hands, and but very little knowledge of practical life."

With due deference to the opinions of the leading educators in this and

other states, whose imperishable monuments are the schools themselves, permit me to mention what seems to me to be the cause of much of this seemingly unfriendly criticism. In the language of the physician, let us make a careful diagnosis of the case and then prescribe.

Teachers are intellectual workers. Their life work is in the realm of mind. Their tastes are literary. They have clean soft hands and unbrowned faces. They do not bear about them the odor of the barn, nor the marks of frequent contact with the soil. They take Turkish baths, perfume their handkerchiefs and live in homes, if not luxurious, at least elegant. They are surrounded with books, paintings and music. There is an air of refinement and culture which pervades their homes and their school rooms. And all this is well. We would not have it otherwise. But the boys—who are they? What will be their life work? A few will follow the example of their master and teacher and will choose their life work in the realm of intellect. It is quite natural that many more should desire to do this because he is their master and teacher. But the great majority will toil with their hands as well as with their heads. In the schoolroom, before the teacher who is himself a gentleman of refinement and culture, skilled in the various kinds of intellectual labor, sit the boys who will decide either deliberately or from the force of circumstances to sweat; the boys whose shoulders must bear the heavy burdens; the boys whose hands will be grim and callous and crooked and cracked with toil; the boys who will cultivate our soil; harvest our grain; dig our wells; build our chimneys; shoe our horses; make our carriages and our harnesses; build our houses; and make our coffins, and dig our graves. Does the teacher—can the teacher—always remember the wide difference between his life work and the life work of most of the boys before him? His tastes are for purely intellectual labor. In that work he gets his pleasure and his dollars. Even his recreations are often of a literary character. But the boys will plow and sow and reap and mow and feed and milk and skim and churn; and from such physical employments and such intellectual labor as will bear either directly or indirectly upon these, must they get most of their pleasures and their dollars. Now out of this divergence of taste grows much of that which is criticized in our public school work, and this divergence has been greatly intensified during the last quarter century by the growth in our midst of a new profession, that of teaching. So long as our schools were in a large measure supplied with teachers fresh from the farm or the workshop, who taught during the winter and labored at some trade, or on the farm in summer, there was but little danger that the true interests of the agricultural classes would be neglected in any greater degree than the other classes represented. The schools of that time were, without doubt, much inferior to the schools of this generation. But in the great advance that has been made, the educational interests of the industrial classes have been left far in the rear. Now we have professional teachers—men who are skilled in the science of instruction. They have mastered mental and moral philosophy. They are proficient in language. They know how to present truth to the child so that it may be by him apprehended. They know *how* to teach better—shall I say it—better than they know *what* to teach to the boy who will gain his

livelihood by milking and making butter and cheese. A strong bond of sympathy is created between the professional teacher and those pupils who desire to make intellectual labor their life work. The pride of the teacher centres in these. He assists them to climb to the very heights whereon he has found so much of pleasure and profit. The others he forgets or only beckons them to follow. It is pleasant for such a teacher to work with such pupils. It is pleasant for him to sift from 600 students, 20 boys—industrious, capable, ambitious to scale the same intellectual pinnacles which he has scaled and then lead them along and up the winding courses of algebra, geometry, trigonometry, botany, rhetoric, chemistry; to read with them Cæsar, Sallust, Cicero and Virgil; to travel a thousand parasangs by the side of Xenophon; to sing again the Homeric song and, using the Greek verb as a turning pole, induce them to practice such mental gymnastics as will give them endurance and strength for the great intellectual combats of life. All this is pleasant but in the very agreeableness of the work there lurks danger.

“Higher departments” have been created in our schools but the agricultural classes do not believe that they are for them. Let it be granted that the course of study is good—excellent; what boots it so long as the future tillers of the soil will not take it? Let it be granted that algebra, geometry, botany, zoology, chemistry—precisely as taught in our public schools to-day are just what the farmer boy needs, what of it so long as the farmer boy himself does not believe it? Certain it is that as the course of study stands to-day, the young agriculturist washes his face, combs his hair, puts on his coat and takes a peep at the outside of it and then goes back to his overalls and the plow. The young lawyer pulls off his coat and appropriates it.

At the State's expense a bountiful feast has been provided. All the young people in the land have been invited to come in and partake. It is even proposed to “go out into the highways and hedges and compel them to come in.” The farmers boys come. They go to the table as eagerly as any. They eat daintily. They taste of this and of that, lose their appetites, push back their chairs and, mentally pale and puny, go to their homes. The merchant boys sit long after the farmer boys have left. But even they when put upon a diet of algebra, geometry, trigonometry and latin, one after another push back their chairs and either go to their life work, or seek more palatable food at the tables set by the Bryant & Stratton's or the Eastman's. But the lawyer boys and the doctor boys and the teacher boys and the preacher boys—how greedily they eat! Dish after dish is cleared. Platter after platter is emptied and disappears. Neither do they seem so particular as to the quality of the food or the condiments. If it's food they'll eat it and look longingly for more. They are the last to push back their chairs. They leave the table only when all the food provided by a generous State has been placed thereon and by them appropriated. When all the dishes have been emptied and they are told that there is no more, hungrier than ever they were before, they reluctantly push back their chairs and go out in search of—more food!

This is not an overdrawn picture of our public schools to-day. This divergence in taste which, as has been stated is the fundamental cause of much that is criticised has led those who prepare the food for the tables to

neglect to place thereon such condiments as will make it relish with the boys who will till the soil. Therefore they consume so little that their mental stomachs are never called into vigorous and healthy action. Digestion becomes impaired and they are at length confirmed mental dyspeptics. My farmer friends, is it not high time that we should look after the "nutritive ratio" of the food that goes upon our public school tables?

Our public schools are *high* enough for the present—make them *broad*er. Our public school system seems to me to be a stairway, consisting of some twenty steps, broad at its bottom and narrow—very narrow—at its top. So broad indeed is it at its bottom step that all the little six-year-olds in the State can get upon it. They *deserve* to get there. They *do* get there. Eager, jostling, crowding, delighted with the new sights that come before their mental vision they clamber to the top of the fifth step. Then the interest begins to abate. Many leave the stairway and step out upon the highway of life. It is quite true that the indifference of ignorant parents, poverty, sickness, and death account in part for the absentees. But large numbers leave the stairway simply because they do not believe that the higher departments of the school are for them. They do not believe it would pay to remain. You and I do not agree with them;—but they go. The sixth step can be narrower and yet accomodate all the pupils who can be induced to stand upon it. The farmers are the first to leave;—then the mechanics; afterward the merchants. Each succeeding step may be narrower than the one before it, and when the twentieth step is reached not five per cent of those who stood upon the lower step will be found thereon. And who are these upon the upper step? They are the future preachers, the lawyers, the doctors, and the teachers. Few merchants, a less number of mechanics, and scarcely any farmers will be found thereon;—and this in an agricultural State.

The leading teachers in the land are demanding *higher high-schools*. Let those who have the public weal at heart demand, first *broad*er *low-schools*. At a meeting of the school principals of Northern Illinois' recently held in Aurora it was unanimously resolved that the elimination of Greek from the curriculum of certain high-schools is a step in the wrong direction, the tendency of which is to illiberalize the schools, etc.

Teachers on all sides are endeavoring not simply to hold the high-school grade where it is; but to make it higher. Would it not be well to expend some of our energy and some of our money in a well directed effort to raise a larger per cent of our pupils up to the *high-school grade*? Is it not of vastly more importance to the State that ten pupils should be raised one degree than that one pupil should be raised ten degrees? Moreover, the one pupil who has within him the desire and the ability to become a lawyer can get there without help from anybody. And if perchance he should fail the sun of justice would not forever be veiled in thick clouds. It is the other ten that need the fostering care of the State; and it is the earnest intelligent effort of the other ten that the State most needs. I suppose lawyers are a necessary evil, but it is to be hoped that the State will not engage in the business of manufacturing them to the extent that its agriculturists will not be able to produce corn and pork and butter and cheese enough to feed them. The State should spare no effort—it should use the public schools and every other instrumentality at

its command to raise the intelligence and thereby add to the skill of its yeomanry. Every dollar thus expended comes back in material wealth that makes culture and refinement and even justice itself possible.

The elements of agricultural science should be introduced into the public schools, if for no other purpose, to make the farmers feel that the higher departments of the schools are for them. We need these studies there as condiments to make the abundant food already there palatable to the farmer boys. We need these studies there to hold the next generation of soil tillers upon the stair-way till they shall get nearer to the top. We need these studies there to open the eyes of half the boys in our public schools to-day, to the fact that there is a higher education which they can take and "organize into a basis for action" as farmers.

The agricultural colleges do not to any great extent directly reach the masses. They cannot. The boys that will plow are not the ones that will take the University course. The magnificent buildings on these spacious grounds could not accommodate one per cent. of the boys now in Illinois who will be farmers. Not one tenth of one per cent. of them will ever darken its doors. Here will be educated the men who will analyze our soils, not those who will till; men who will use the transit and the sextant; not the spade and the plow. Here will be educated the men who will be able to make scientific investigation in the interests of agriculturists;—men who will be capable of making agricultural experiments and from them deducing such laws as will guide the plowman in his work. It is through the public schools, and I had almost said through the public schools, only, that the masses can be educated.

The agricultural periodicals are an educational power. But these cannot reach those who most need them, because the needy ones themselves are so unfamiliar with the terms of science that they cannot understand the language of scientific agricultural truth. Four men of five whose names are found on the subscription lists of the *Prairie Farmer*, the *Western Rural*, the *Farmers' Review*, the *Country Gentleman*, or the *American Agriculturist* do not read the scientific articles. They are not able to do this. They are not familiar with the language. The words there used are not in their vocabulary. Neither will they be in the vocabulary of the next generation of farmers except they are put there through the instrumentality of public school education.

This great university and the intelligent men who are connected with our agricultural periodicals will continue to do the noble and necessary work they are now doing. They will educate the few, and through these few, indirectly but slowly, O how slowly! the masses. Through the machinery of the public schools the masses may be promptly reached.

But here we find a difficulty. Where shall we obtain the teachers? Where are the men who are competent and willing to go into our district schools and judiciously and wisely instruct the boys in the elements of agricultural science? Teachers there are who can instruct a boy in the elements of oratory; who can inspire him with a desire to emulate the virtues of Daniel Webster and Henry Clay; who can create in the youthful mind an ambition to become a civil engineer, a poet, an artist, a divine, a statesman;

but where are the teachers with which to fill our district schools, who can inspire the boys who choose to sweat in the hay field with an earnestness of purpose that will make of them intelligent tillers of the soil? *They are not.* Neither are we, through our public school system, doing anything to produce them. Our normal schools are in no way aiding us in this work.

Our district schools are supplied with teachers chiefly from the graduates of our city high schools. They are intelligent young men and women who can write a letter of which neither they nor their instructors need be ashamed. They have much more than the average amount of that refinement and culture so desirable for all. They are ladies and gentlemen. In addition to their many other attainments many of them have had training in the theory and practice of teaching. They know something of the science of instruction. They are in many instances well prepared to teach our children to read, to write, to spell and to "speak pieces;" but they have no adequate appreciation of the special educational necessities of him who is to earn his bread by tilling the soil. Consequently they utterly fail to show the pupil the many points of contact between his school work and his life work. They fail to create in the mind of the farmer pupil a desire to extend his knowledge far beyond that which he shall obtain in the district school, unless, perchance, they induce him to seek the honors and emoluments of professional life. They fail to stimulate the pupil to acquire a large amount of that knowledge which he can "assimilate and organize into a basis of action" as a farmer. Therefore the farmer pupils leave school as soon as they are barely able to read and write and "cipher to the rule of three;" unable indeed to read scientific agricultural truth. So meagre has been their intellectual training that they will be unable through life to make the data of their own experience the basis of such reasoning as will lead them to correct conclusions. They will go through the world planting their potatoes and killing their pork by the moon; forecasting the weather on a gopher-robin-muskrat basis; splitting caudal appendages to cure the horn-ail, and burning the roofs of horses' mouths to give them an appetite for corn.

The more intelligent farmers of this agricultural state, many of whom are members of this Association, should see to it that there are normal schools established whose mission should be to educate teachers for the district schools. A body of school principals assembled in convention not many weeks ago advocated with great unanimity the establishment of several new state normal schools. They even appointed a committee whose duty it should be to make every possible effort to secure the necessary legislation. Members were urged and instructed to aid in creating a popular sentiment in favor of the movement. This is right. The State of Illinois can better afford to train teachers at her own expense than to employ untrained ones. But shall not some of them be trained with especial reference to the needs of the farmer pupils? Would that there might be such a school, located under the wing of this university, and that it might annually send out an army of young men, perhaps not themselves in a broad sense agriculturists, not graduates of the "College of Agriculture," for these would not accept positions in the district schools, but young men with a good knowledge of the common English branches, familiar with the improved methods of instruction, and

moreover, earnest and enthusiastic in their desire to lift the next generation of farmers to a higher educational level. Put these into the district schools. There would be an immediate demand for them. Let the farmer boys not only hear of Whittier, Longfellow, Bryant, Emerson, Lowell, Washington Irving, Sir Walter Scott, Tennyson and Shakespeare, but of Joseph Harris, Dr. J. B. Laws, Prof. Attwater, Chas. L. Flint, Geo. E. Waring, Joseph Johnston, Manly Miles, Henry S. Randall and the faithful workers in the agricultural department of our own school at Champaign. Let them be led to see the points of contact between the mathematical knowledge they are acquiring and the farm. Make them feel their need, as farmers, of a larger vocabulary by requiring them to attempt to read Johnson's "How Crops Grow," and "How Crops Feed." Make them feel their need as farmers of some chemical knowledge in order that they may be able to understand better the science of feeding and the management of manures. Let them discover their own inability to read the best portions of the *Prairie Farmer*, or the *Western Rural*. Let them not only be taught the pedigree of the English kings, but of "Goldsmith's Maid." This latter not so much for the valuable lesson on in-breeding that may be found therein, as for the purpose of interesting them in the study of stock-breeding as a science. Let them study the skeleton of a horse; learn the names of the bones and of the joints and the location and nature of a spavin, a ringbone, and a splint; induce them to examine horses, both those that have these defects and those that are without them. Then will they become willing learners of English grammar and rhetoric. For they will desire to acquire that skill in the use of English that will enable them to describe their pet horse in language as free from solecisms and barbarisms as is the horse from curbs and splints and thoroughpins.

All the boys are taught declamation on the ground I suppose that any boy is likely to be elected to Congress. Why not teach all the boys the chemistry of the soil on the ground that every boy will sometime in his life have a garden? It is quite safe to say that the average boy will find as frequent opportunity to use his knowledge of the elements of which the soil is composed as he will his oratorical acquirements.

Let an atmosphere of labor pervade the school room. Make the young farmer pupils realize that the school life is the best kind of preparation for the farm life. Let them be made to see the points of contact between the two and they will be led to *think* and *read* concerning those things they are to *do* in after life. Then will the toiling masses realize that the higher departments of the public schools are for them. Then will the farmer pupils climb the public school stairway to its very top. Then will our farm libraries grow. Agricultural periodicals will be in better demand and will be better read. The work of the agricultural department of this great University will be better understood and therefore better appreciated.

In the catalogue of this institution I find these words: "Agriculture involves a larger number of sciences than any other human employment and becomes a fit sequence to any collegiate training." The accuracy of the statement cannot for a moment be questioned. But there are thousands of men in this great State who can never become scientific agriculturists but

who are daily practicing the art of agriculture and to whom a knowledge of the merest rudiments of agricultural science would be of inestimable value. Let us not then make the mistake in our public school work of putting off the investigation of agricultural science until the pupil shall be thoroughly prepared to engage in its systematic study. Rather let us catch and hold the attention of the farmer pupils by presenting the more simple and practical truths selected almost at random from the broad field of agricultural knowledge. Thus and only thus shall we enlist him in the good work of lifting himself as a farmer and with him his farmer neighbors, to a higher educational level.

Says Prof. David Swing in a recent article entitled "Educated Farmers:" "For many years, and even centuries, education took the direction of theology. By degrees it widened out so as to set aside a little of brains for the legal profession. But lawyers were amazingly scarce from Cicero to Puffendorf. Education then widened out and omitted about a million monks and priests to make a Shakespeare once in a while. It went on expanding until doctors and poets and editors appeared. At last education spread out and began to send into the fields educated farmers."

This good work of educating the soil tillers has but just begun. Of the farmers only a few can as yet be said to be educated (among these as a matter of course are those who attend the meetings of this association) and upon these devolves the duty of assisting in another widening out of education until it shall include the rank and file of the soil tillers. To do this we need the agricultural department of our University; we need experiment stations; we need our ably edited periodicals; we need the associations of dairymen, of wool growers, of stock-breeders.

We need every educational influence or power that can be brought to bear in this direction. But in order to make all these a success in the highest degree, we need the public schools; that through them the farmers of the next generation may be prepared to appreciate and utilize the work which is already being done by these other educational forces. That through them the very class in whose interest this University was planted may be enabled to put forth its hand and pluck some of the ripened fruits; that through them the feet of those who cultivate our prairie soil may be lifted out of the mire of indifference, and placed firmly upon the bottom step of that grand stairway which, without taking them away from the farm will lead them to a higher educational level and to such intellectual activities as will divest farm life of much of its monotony and will make of them intelligent, progressive, law-abiding, wealth-producing farmer citizens of this republic.

DR. DETMERS: I understand that we are to continue the discussion of Mr. Chester's paper of this afternoon. I think that Mr. Chester said that he attributed the prevalence of disease among swine to improvements in breeds, that by forcing the pigs their constitution was weakened. There is undoubtedly some truth in that, but to say that this hog cholera can be attributed to that cause would go too far. This cholera was imported into the country with pigs that came from England, over thirty years ago, into Kentucky, I think, and from there it has spread all over the country. That disease is caused by a small microscopic organization; it is no respecter of any breed;

it may be that a pig whose constitution has been weakened, by riper improvement may sooner succumb. All we have to do is to protect our pigs to prevent the spread of the disease all over the country. What we need are laws that prevent any transportation of diseased or dead hogs; and laws compelling every one to bury, or better still, to cremate his dead hogs. The old custom is, the living hogs eat the dead ones, and not only this disease is spread, but another disease, trichinosis. The Germans and the French don't want our hogs; they are right; they say that they have trichinosis in hogs, about one in 4,000. We have a great many more, but we can root out this disease. No man or beast ever gets trichinosis unless that man or beast eats meat that contains these little animals, because trichinosis has to pass through two organizations before it will multiply; it lies dormant in one animal, it cannot multiply. I will say to you it is throwing away money to invest in cholera medicines, they do no good. Complete separation will prevent the spreading of this disease, and nothing else will. For instance, if it breaks out among your hogs, separate the diseased ones from the healthy ones, putting the healthy ones, if possible, upon higher ground, which must by no means receive any drainage from the other lot. They are to have clean water, every time drawn fresh from the well, and throw out what they leave, that nothing that may be flying in the air may be deposited in the water; you can teach them to water regularly. If the disease breaks out among your pigs, divide them into three lots, one composed of the perfectly healthy ones, showing no symptoms of the disease, to be separated and taken care of as I have described. The second lot are the doubtful ones, when you cannot tell whether they have taken the disease or not; their ears will droop, or the curl will be gone out of the tail; separate them and care for them in a high, dry place. Then there are those that are certainly diseased; put a little carbolic acid in their water, say eight to ten pounds to one hundred pounds, do that about once a week. This disease finds an entrance into the animal system in two ways: First—Through the digestive canal, through food or water that has been contaminated. Secondly—Through sores, wounds and lesions; no matter how small, it will absorb these disease germs if they are in the air, therefore my advice would be to avoid all operations on your pigs if the disease is within two miles. If such an operation should be necessary, wash the wounds with carbolic acid or some other antiseptic until it has healed. Old straw and rubbish will have germs of this disease in them, so avoid them. The hogs must be kept clean, and if all of these rules are kept there will be not much danger of spreading. It should be a criminal offense for people to throw a dead hog into a creek or pond where other hogs are liable to drink, instead of burying or otherwise disposing of them.

MR. CHESTER: It has been affirmed two or three times to-day, that I said that the better breeding had created disease in swine. I intended to say no such thing, what I did say was this: that it was a question among farmers, as to the propriety or impropriety of pursuing this matter of early maturity. I said that in pushing stock to early maturity there was a possibility of giving them constitutional weakness and thus disease.

DR. MILLS: That is true, not only in breeding hogs, but in all classes

of animals, pushing them beyond the ordinary health standard, is detrimental to life and especially in putting on fat. It is a lower grade of life. It is very easy to put on fat, but to put on brain and muscle and fibrous structure another and higher organization requires not only exercise in the animal, but a better class of food.

DR. TEFFT: It has been my misfortune to examine many cases of trichinosis in hogs, and I find that different sections of the country are more likely to be affected than others. I have made many examinations where we have found perhaps one in a thousand; further south they are found one in fifty, one in ten and so on. Hogs get trichinosis by eating other hogs and the chickens eat them, or the rats, and the cats eat the rats and any animal that eats another affected in that way, surely become trichinosed.

DR. DETMERS: You may ask me where German hogs get their trichinosis. In Germany they are compelled to bury their dead animals and they do it, I tell you. The Germans are very economical people, they don't throw away anything; what they think is not good to eat themselves, after they kill their hogs every year, they give to the pigs, the pigs get the offal. That is the principal way in which trichinosis is perpetuated in Germany. So in France the pigs are remarkably free from trichinosis. The Frenchman is still more economical than the German; where the Germans throw it away the Frenchman prepares it in some way and makes it palatable and eats it himself. The most dangerous source of trichinosis is in the slaughter-houses of the butchers and the rendering establishments. The lard which is made into swine-butter, often is full of disease germs, and the heat that the lard is subjected to is not enough to kill the living things that will be in it. I have examined such lard, and I have found bacteria in it, and I have found some other things, I don't need to mention.

MR. DEXTER: It is claimed by people who ought to know, that the animal organization known as trichinosis is never found in the fat of the living hog.

DR. DETMERS: I have examined a great many thousand hogs and I must say I have seldom or really never made a special examination of the fat parts, because I knew that they were not there. But incidentally I have examined some of the fat parts and I never found them there. There are certain places in the body where they are, if anywhere, that is in the muscles of the larynx and the muscles of the diaphragm. These animals seem to possess some instinct; when they come to the fat they stop about one-eighth of an inch from the line between the fat and the lean. I find hogs coming from counties where they never had swine plague, for instance from Dakota, I found only one trichinaed, and I am quite sure that was a new comer, either belonging to Illinois or Iowa. I found none in the Minnesota hogs; Wisconsin was wholly free, only in the southwestern part. Some counties in Iowa had very few; Central Iowa and Central Illinois and Michigan are pretty bad.

DR. MILLS: Bacteria do not occur in fat but they may get into the rendered fat, where the whole hog was rendered or thrown into the tank. Then of course the hog was affected with bacteria; the bacteria can be found in the lard. Then there occurs a worm in the kidney fat, or close to it.

There are also some kinds of abscesses, and of course where an abscess burrows through the fat to the skin, these abscesses always contain bacteria; but otherwise in the solid fat, I don't think anything is found there.

Adjourned to 9 A. M.

FRIDAY MORNING SESSION.

Met pursuant to adjournment at 9 o'clock.

REPORT OF PRESIDENT.

I received in 1883, \$499.50 from the State as an appropriation for compiling and publishing the reports. In 1884 I received the same sum, \$499.50; \$500.00, less the expense of exchange in both cases; that I deposited with the Treasurer, and have his receipt for the same.

OBITUARY.

DEATH OF ISRAEL BOIES, ESQ.

Your committee on obituary would respectfully report that they are informed of the death of one member of the Association during the past year—Mr. Israel Boies, late of Genoa, Ill.; and would recommend the adoption of the following resolution:

Resolved, That this Association have learned with deep regret of the death of Israel Boies, late of Genoa, Ill., one of the original members of this Association. Mr. Boies was an enthusiastic student of all questions relating to the breeding and management of dairy stock, and the manufacture of butter and cheese. He was a man of great energy and intelligence, liberal and benevolent in his disposition, especially endearing himself to all those who sought his help and advice, by his earnest and painstaking labor in assisting them. He was for many years among the best known dairymen of the West, and did as much as any other man to make known the extraordinary capabilities of the West for dairying and to bring its products into prominence. The dairy interest has lost an enthusiastic friend, the farming industry an intelligent advocate, the community a distinguished and honorable citizen. We extend sympathetic condolence to the members of his family, and direct the Secretary to make record of this action of the Association in its annual report by using a page in the proceedings for that purpose.

C. E. MANN,

C. C. BUELL,

C. H. MILLS,

Committee.

REPORT OF SECRETARY.

REPORT OF TREASURER.

Total receipt's.....	\$1,109 00
Dec. 14. Paid on order Pres. and Sec'y, expenses stenographer at DeKalb, regular annual meeting.....	\$ 7 00
Same order, ex. connected with that meeting.....	2 47
Same day, expense connected with Ass'n, order to H. B. Gurler...	14 53
Jan. 15. Same party, for same purposes.....	5 50
Jan. 15. R. H. Kelly, sten. rep.....	50 00
Feb. 25. R. P. McGlincy for expenses connected with pub. rep....	313 20
Mar. 11. " " postage and incidental expenses.....	2 00
Mar. 11. Additional expense publishing report.....	7 55

Total expenditures	\$ 402 25
Leaving a balance in the treasury of \$706.75 for last year.	

The following resolution was offered by D. W. Wilson :

WHEREAS, The dairy interests of this State represent one-fifth of the annual agricultural products of the State of Illinois, and it is desirable that this interest should be better represented at the annual State fair,

Resolved, That a committee of three members of this Association be appointed to confer with the State Board of Agriculture and endeavor to secure an appropriation and an opportunity for making an exhibit such as this interest demands; and that the State Board of Agriculture be requested to provide a suitable building for making an exhibit both of dairy products and machinery at the annual fairs of the State Board.

Motion to adopt put and seconded.

MR. HOSTETTER : I think it would be very much better to have exhibits of butter if we have any at the time of the Fat Stock Show, instead of the time of the State Fair, and I would like to see it so amended.

SEC'Y MCGLINCY : Mr. President and Gentlemen of the Association, I don't know but I am going to differ with every man, woman and child in the State to-day on this question. I am opposed to it, and my reasons will be given briefly. I believe in advertising; always have. A year ago I stood in the halls of this convention and urged the dairymen to unite with the fat stock show people of this State, and secure a display of butter and cheese at that annual meeting. My friend, Mr. Chester, was present, and said, "that is a good idea." Col. Mills, chief clerk of the State Board of Agriculture, told me a few days before it could be done. Everybody was in favor of it; at least I thought they were, but I was mistaken. I was appointed with my friend Broomell to meet the State Board of Agriculture at Springfield, to arrange for the exhibit at Chicago last November. Misunderstanding the date of the meeting, we were not present, but subsequently upon invitation of the board, the President, Vice-President of this Association, and myself, attended the meeting in Chicago. We laid the matter before the State Board of Agriculture as best we could, and we so worked upon the feelings of that body that they unanimously voted an appropriation of \$500—for which I thank it and every one of the members of the board—for the purpose of making an exhibit of butter and cheese in connection with the fat stock show in November. I went home, called a meeting of the members of this Association, and made a report to them, stating what had been done. In my enthusiasm I felt confident that \$1,800 or \$2,000, or \$2,500 could be raised in the State, and we could have a creditable show—one that would redound to the honor of the State of Illinois—and I was in the mood to put the machinery in motion myself; but not having time to do it, I suggested that a committee of two members of the Board of Directors be appointed to visit Chicago, and other places, and ascertain if it would be possible to raise \$1,000, \$1,500 or \$2,000 and offer the same for premiums for butter and cheese at the fat stock show. The committee was appointed, they went to Chicago, they struck a street corner, put their thumbs in the arm-holes of their vests and saw the procession go by; no money was raised. I have not been in a condition yet, although a year has passed, where I could stand up and look one of the members of the State Board of Agriculture in the face, because we failed to do our part. My friend Broomell suggested yesterday that prob-

ably we could raise by subscription, among the dairy farmers in the State, a sufficient sum to make a creditable show. It did not seem to be possible, and for my part I don't feel like asking the State Board to make another appropriation until the dairymen and manufacturers are ready to do their part. If this resolution is adopted I don't think you can get any member of the committee that attended the meeting of the State Board of Agriculture to go there again, nor do I believe you can get any members of that committee to do a thing. It doesn't seem to me that it is a fit time to make an exhibit of butter in September when the State Fair holds its meeting, because the weather is against an exhibit of butter at that time; there cannot be provision made for keeping butter in good show condition, and as a consequence we are the laughing stock of all the dairy States in the country. In connection with this, I may say further, I have had the audacity to urge people to make an exhibit of butter at the great world's fair to be held at New Orleans. It seems to be impossible to get the dairymen of this State interested unless the premiums are so large as to pay for the cost of the product, because they know that goods placed on exhibition at that place will deteriorate.

MR. WILSON: I think the dairymen of this state, had they a place to put their goods, and the manufacturers of dairy implements had a place to put them, would give a creditable show. Now the fat stock show is not a dairy place; people don't go there to see dairy products, they only see how much meat can be put into cattle, and, therefore, the two interests do not entirely harmonize. The fact that Mr. McGlinchey, after securing the appropriation, failed to make this end of the line good, ought not to militate against our trying to induce our friends to make a creditable show in this state. The dairymen in this state, as a rule, attend the state fair, and as a rule they do not attend the fat stock show. I believe that the State Board of Agriculture are disposed to fix these things, but until they are asked to provide a place by the dairymen I doubt if they will, but when they do provide a place I believe the dairymen will come up to the mark and we shall have a creditable show. At the St. Louis fair, last September, a whole building was devoted to dairy products, probably ten or fifteen thousand dollars worth were there, and there was as much interest in that exhibit as any other part of the show.

MR. CHESTER: I just want to say, Mr. President, that I am very much surprised that this resolution is offered; I have been for months and for years, knowing that one-fifth of the dollars that come from the farm in the State of Illinois, come in this dairy product. I say I have been astonished when I remember these things, and then when I remember how little these dairymen, these thinking men, these men who have the reputation of being men of unusual intellect, I say I have been astonished to think how little interest they take in showing to the world the magnitude of their business and advertising it through the fair. As a member of the State Board of Agriculture I have by individual members of this Association and individuals interested in dairying, I have been importuned occasionally with the idea that the State Board of Agriculture has not been doing its duty towards the dairy interests; and as a member of that board I am willing to admit it, but let me say to you, gentlemen, there is not an interest in the State but

what takes some trouble to represent itself to that board, and I give you the evidence of your own Secretary that when you did make a spasmodic effort for one moment to represent yourselves before that board you had a respectable hearing, and you not only had a respectable hearing but you had a respectable appropriation for the thing you desired, then they simply called a halt and decided they did not want to do what they came to us and claimed they did want to do. As to claiming, there isn't an interest in the State but does come before that board and make its wants known—the horse men, the fast horse men, and the slow horse men, the cattle men and the swine men, have all come before that board and made known their wants, and their wants have been invariably respected by them, and we know something about their wishes and desires, and how to treat their matters; and I want to say that with the exception of that one effort there has not, to my knowledge, been any effort ever made on the part of the dairymen. Notwithstanding all these things, I want to say on behalf of the board that we are willing we are anxious to represent every interest that comes to our attention, and if you see fit to adopt this resolution I am quite sure that that board, if they are called upon in earnest—not simply that you ask to have dollars appropriated for premiums, and then leave the benches empty after asking them to be prepared for you, leaving the premiums uncalled for, uncompleted for—I say if this is the object, they may possibly treat you coolly, but if you come with assurances that you mean what you say I assure you, gentlemen, the State Board will meet you more than half way. Motion put and carried.

Committee of three nominated, composed of C. C. Buell, D. W. Willson and H. B. Gurler, to carry the resolution into effect.

REPORT OF COMMITTEE ON DAIRY UTENSILS.

Mr. President: Your committee on dairy utensils would report that they find on exhibition one DeLaval cream separator; one boiler and engine, manufactured by Robinson & Burr, of Champaign; and one combination milk pail and stool exhibited by Gilmore & Co., of Chicago; all of which articles we think worthy of favorable mention.

CHAS. ELLIS.

HENRY PUTNAM.

H. B. GURLER.

Report of committee on dairy utensils received and adopted.

DRAINAGE AND THE DAIRY INTEREST.

BY C. G. ELLIOTT, TONICA, ILL.

Whatever can be done to improve the grass crop of our country, either with respect to its quantity or quality, is of great importance to the dairyman. When we reflect upon the fact that this family of the vegetable kingdom comprises about one-sixth of the whole, and forms the basis upon which the industry of animal husbandry is built; that it is an important part of Nature's covering, a renovator of the soil and an important agent in the conversion of rock into soil matter, its importance as a factor in our mate-

rial prosperity stands out before us in its proper proportions. Some one has said that the road of a country's prosperity has been made over a firm grass sod. Certain it is, that as far as localities are concerned, good grass regions prove the truth of this statement.

While it is true that grass is Nature's universal covering, and that some variety of it will grow upon almost every soil, yet a large part of the product is of little value to the dairyman by reason of its poor quality, light yield and other drawbacks incidental to climate and soil. Nature adapts vegetation to the soil, and not soil to vegetation. The grasses adapted to arid and shallow soils, as well as those which thrive best upon wet soils, are not suitable for dairy feeding, since the first yield too little in quantity, and the second are too poor in quality. I am speaking now of the products of soil in its natural state. The improvement of grasses by a proper treatment of the soil, as suggested by observation and experience, is a profitable theme for consideration. The poet says:

“Each soil hath no liking for every grain,
Nor barley nor wheat is for every vein;
Yet know I no country so barren of soil,
But some kind of corn can be gotten with toil.”—*Tusser*.

The qualities of grass especially sought after by our dairymen are:

First—Abundance of yield;

Second—Excellence of quality;

Third—Length of feeding season.

It is the purpose of this paper to discuss the influence of drainage upon the grass products of our dairy sections, and also its bearing, in a general way, upon this important industry.

GENERAL NEED AND INFLUENCE OF DRAINAGE.

Those occupying the grain-producing sections of our State have taken up underdrainage as the panacea for poor crops. There are many localities in our State which, for many years reported “no corn,” “no wheat,” “no oats;” “poor grass.” “Why?” “Too wet.” And again the same cry has come to our ears, made more ringing and despairing, echoed by empty cribs and granaries, “No grain!” “Why?” “Too dry.” But the inanimate drain-tile, molded from the clods at our feet, has since made these fields speak of plenty and raised their owners to affluence.

It has been the universal practice to turn all fields which for any reason were unprofitable for cultivation, into pastures and meadows. Hence we see almost every pasture largely made up of hilly or flat and swampy lands, often the receptacle of all of the surplus wash of the adjoining fields. If a field proves too wet for cultivated crops, it is seeded to grass. If it is too wet to produce hay, it is fenced and pastured. This is often done under the delusion that good, sweet grass will grow anywhere, and that no land is too poor for pasture purposes. It is wise for us to take these things as they are, and investigate with a view to improvement. Our cows sometimes speak very emphatically to our pockets, at least, and say, “Give us good food and plenty of it, and we will give you an abundance of rich milk.” While we

give so much attention to the perfecting of the products, we may find that it is just as important to increase the value of the raw material which makes excellent dairy products possible.

ABUNDANCE OF YIELD.

We first want our land to produce the greatest possible quantity consistent with good quality. Our most valued grasses require a deep, rich, moist soil, in order to give a maximum yield. They require a deep soil so that the roots may have a range of soil to secure them from the effects of drouth and sudden climatic changes. A thick and strong growth of good grass cannot be obtained without such soil. The heaving of grasses in winter and spring, which often reduces the yield, is owing to the fact that there is too much water in the soil and about the roots of the plants, which expands by sudden freezing throwing the plant upward. This breaks the roots and as the thawing of the soil takes place gradually, the plant never resumes its former position, and is often entirely destroyed. Many have doubtless noticed the bogs or "hummocks" in our wet pasture lands. Their peculiar appearance is largely due to the heaving of wet ground, and their disappearance marks the line between drained and undrained soil. In the spring and early summer, the spaces between the bogs usually contain water or bare soil, while the mound bears the grass. Our mowing lands often show a mixture of cultivated grasses with wild water grasses, the growth of a sour, wet soil. We count two stalks of half-grown timothy and seven spears of healthy water grass. Can we pull out the grass as we do weeds from our corn and thus secure a good growth of grass? We find that by so doing nothing is gained. Drain the soil, and we take away the nourishment from the sour grasses and add to that of the useful plants.

Our grasses require a moist soil—not wet—in order that they may maintain a constant growth. The growth made one week should be but a sample of the growth made every week of the season. The artificial drainage of grass-lands brings about this result. It makes the difference between one ton and three tons of hay per acre. It makes the difference between three acres of pasture for the support of one cow, and two acres for the same purpose. At the high price at which dairy lands are held, it is poor economy to allow land to remain in such a condition that it produces only half of what it is capable of producing. While it is true that grass will withstand the effects of a wet soil better, for a time, than cultivated crops, it has been found by many experiments, that the difference in yield alone between drained and undrained grass-land gives an increasing and handsome profit to the land drainer. It may be put down as a fact that much of the wet grass-land of our dairy sections can be made to produce one third more than they do, by proper drainage.

EXCELLENCE OF QUALITY.

Not only can the yield be greatly increased, but much can be added to the quality of the product. The nutritive value of good hay has been found by experiment to be one in six, while that of poor hay is only one in ten. Every dairyman knows that the quality of the dairy product depends largely upon the quality of the grass upon which the animals feed. Much discussion

has taken place regarding the best grasses for pasturing purposes. Now one great difficulty with all of the useful grasses regarding their quality and development has been in the state of the soil, as regards its depth and moisture. It is often the case that after land is put in good producing condition, excellent grasses creep in of themselves and occupy the soil. Wild and sour grasses will not flourish on a rich drained soil. Nature provides grasses suited to the swamp and the hill, but man may often so manipulate the soil that it will produce those plants suited to his taste or needs.

The *uniform* quality of the pasture grasses during the growing season is a point secured by drainage. Plants which start in the spring and grow from a saturated soil are of inferior quality and rarely sought after by stock if firm dry land is accessible. In midsummer when the land has become somewhat drained by natural processes, the nutritive qualities are greater, and the quality of the product varies with the vicissitudes of season and climate. Drain this land and we secure a more uniform quality of product because the soil upon which the plant feeds is kept in a more uniform state as respects temperature, moisture, and physical condition.

LENGTH OF THE FEEDING SEASON.

It is an advantage of no little import, if by drainage we can add a month or two to the pasture season. As it is with ordinary pastures, the portions which are naturally drained must furnish the early spring feed, for the wet parts are unfit either for animals to pass over or feed upon. Suppose that the whole pasture were in a fit condition at the earliest starting of the grass, we should then avoid the excessive cropping of the productive portions and would in a short time have full feed for the whole herd. Grass upon drained soils springs earlier and continues in growth longer in the fall, for the reason that the soil becomes warm sooner in the spring and remains so longer in the fall, and supports a stronger and thriftier vegetation. There is the same difference that we see between the well housed and fed domestic animal at spring time, and the one left to find shelter behind the hedge and dig in winter snow for his food. The one is ready to make growth and thrive upon the first offering of green grass, while the other is backward and requires half of the summer to overcome the effects of a hard winter.

DROUTH AND WET.

Spring wet makes grass backward and injures its quality, while summer drouth cuts it short in quantity. It is probable that these extremes cause more solicitude to dairymen than anything else connected with feeding. Drainage makes both a wet and dry soil moist, and keeps it in this state, which is just the condition required by our most valuable grasses. It may be remarked here, that observation teaches that ordinarily grass-lands are more subject to injury from dry weather than cultivated lands. It has been found that cultivation of itself has much to do with the retention of moisture which condition is wanting in meadows and pastures. For this reason alone, drainage would seem of greater necessity in grass-land than in cultivated fields. The good effect of drains during dry weather can be proven not only by the growth of vegetation, but by observing the action of a tile drain at a time when the surplus water of the soil is exhausted. At evening the water

ceases to flow, but in the morning a small stream may be seen issuing from the drain. This is the result of the moisture of the atmosphere which was condensed in the soil during the night. Col. Waring asserts that "the lawns of the Central Park which are a marvel of freshness when the lawns about the park are burned brown, owe their vigor mainly to the drainage of the soil." The roots of some of our best grasses often extend to a depth of three or four feet. Good grasses if they grow at all on wet land must adopt a shallow root habit and thereby be subject to all the changes that a variable climate can bring upon them.

ROTATION OF CROPS.

It is well understood that the production of grass by no means covers the dairyman's farming interest. He must grow grain and forage plants for winter use. He must practice rotation of crops and make every acre of land produce to its full capacity. No waste and useless spots should be left in a cultivated field. In short it should be the aim of every dairy farmer to bring his land into such a condition that it will produce some profitable crop. If possible it should be so drained that a rotation of field crops is possible upon any part of it.

WILL IT PAY?

Draining costs money, but if the preceding statements are true, as I believe they are, it is costing money every year not to drain. But the objector says, "I can better spend my money in the purchase of Western land. I can buy five acres of wild land for the sum that the drainage of one of my swamp acres would cost me." Very well, but your swamp acre when drained holding the location that it does, would yield you an income equal to that which you would be likely to obtain from ten acres of wild land. I merely suggest this, that it will be the part of wisdom for the dairyman to look over his farm and determine what part of it is producing nothing, one-third or one-half of what it should produce, and determine whether, at the present price of drainage work, he can longer afford the annual loss resulting from the neglect to improve his wet land.

I take the liberty of quoting the words of a few Illinois dairymen as left recorded in the reports of previous years, which have a practical bearing upon what has already been said upon the subject of drainage.

M. H. Thompson :—"The first essential of a good dairy farm is to have it without slough, mountain, foul stuff or mortgage."

Dr. Woodward :—"Did not want too much wet or low land. Preferred rolling lands for dairy use."

Thos. Bishop :—"Preferred rolling land not too wet or too dry; upland stood more drouth."

D. C. Adams :—"Sloughs should be drained by tiling or ditching, and if by the latter, the ditches should be covered or fenced."

HOW TO DRAIN.

It is not the purpose of this paper to give details pertaining to the work; a few leading suggestions are all that will be attempted. Study the soil from a drainage standpoint, that you may know the depth and frequency of drains that will be suited to your purpose. Determine whether ditches or tiles

should be used for mains. If ditches, do not use tiles instead. If tiles, get the right size and put them in properly. Look well ahead when locating drains. Know where you are coming out as well as where you begin. See that the details of your work are carried out in a thorough manner. Master the theory and art of drainage, if possible, and apply your knowledge to the work in spite of all the remonstrances of so called "practical ditchers."

DRAIN WATER FOR STOCK.

Perhaps mention should be made in this connection of the use of drains in supplying stock with water. In some localities drain-water may be utilized in this way very profitably. There are a number of "ifs" and "ands" about the matter that ought to be considered. We note first, that if drainage has been done thoroughly, the supply of water will fail when needed most, that is, in a dry time. If good drainage is desired for all of the land included within the range of the drains, no watering place should be arranged that would interfere with their operation in any way. Sometimes the nature of the land is such that the outlet can be protected, and a paving of timbers or stones made so that animals can drink without interfering with the flow of water or getting into the mud themselves.

Where the fall is sufficient there are several ways in which drain water may be made accessible to stock without in any way interfering with, or injuring the drain. At some point along the line of the drain where the fall is sufficient, place an eight-inch tile in an upright position underneath a joint of the drain so that it will act as a small well. Insert the end of a gas-pipe into this well just beneath the floor of the drain, and extend the pipe down the ditch beside the tile until a point is reached where, if the pipe were turned upward to the surface, it would still be a little lower than the upper end of the pipe at the well or reservoir. If there is enough fall in the distance, the pipe may be extended so as to discharge into a tub or trough at a convenient height from the ground. A waste pipe may be attached which will convey the overflow back into the drain. This arrangement of pipes will furnish a supply of water for stock as long as there is any water flowing in the drain at the small well, and will in no way interfere with the perfect action of the drain.

Another plan the feasibility of which depends entirely upon the surface of the ground adjacent to the outlet, is as follows: Let the drain water of a field be collected in a tank or well of greater or less depth. Now take the point at which the water is to be discharged, which may be a trough at a convenient height, a little lower than the level of the outlet tiles which discharge into the well, and lay a watertight pipe from a point near the bottom of the well to the watering trough. This pipe should be sewer pipe with cemented joints and laid as drain pipes are usually laid. The pipe should be large enough to discharge the water from the well as fast as it comes from the drains, thereby keeping the drains in perfect action. This plan, it will be observed, requires land with considerable fall near the outlet and cannot be used in flat sections.

In thus earnestly calling the attention of the dairy interest of our State to the value of drainage, I am confident that no more prominence has been

given to the subject than it deserves, nor more accorded it as an improvement than can be sustained by the practical experience of members of this Association. We are fast approaching the era of what is termed "high farming" and the drainage of our wet lands whether they be used for pasture, meadow, or cultivated crops, is the first step that must be taken in this direction.

DAIRYING IN CENTRAL ILLINOIS—ITS ADVANTAGES, DISADVANTAGES, AND MODES OF PROCEDURE.

BY RALPH ALLEN, DELAVAN, ILL.

Dairying in Central Illinois has not thus far formed a principal feature in our agriculture. The few dairies that flourish have not heretofore been sufficiently numerous, or of so great importance as to amount to a unit in our agriculture. Our live-stock consists mainly of horses, hogs, sheep and beef cattle, and our principal farm crops have been corn, oats and wheat; these crops of grain being the chief source of revenue to the greatest number of our farmers. Upon those farms where cattle and hogs have been pastured and fatted the land has usually retained its natural fertility and ability to produce large crops of grain. Upon farms where grain has been continuously raised and sold, the soil has generally become incapable of producing profitable yields of grain. While Central Illinois always has been, and probably will continue to be a great corn, oat, and wheat country; yet to continue to produce these great grain crops at the enormous yields per acre of which our prairie soil is capable, and at the degree of profitableness with which intelligent farmers ought to conduct their business, and which in the past has been a characteristic of Central Illinois farming, our lands should be in the highest state of fertility; to accomplish which they should be subjected to a continuous process of restoration to their natural fertility. The first crops raised after the original prairie sod was well rotted, were as a rule of the largest yield and the most profitable the land has ever produced. At the present time our largest and most profitable yields of wheat or corn are the first, second or third crops succeeding an old pasture or meadow. Such crops indicate a method of enriching the soil so as to produce crops equal to the natural capacity of it, that is, to have each year a piece of grass-land to plow up, upon which to raise several crops of grain and then re-seed to grass; or in other words to pursue a system of rotation of crops of which grass forms a principal part. This suggests the subject of the most profitable disposition of the grass crops. To derive the greatest benefit from the grass as a fertilizer it should be fed upon the farm in such ways that all the manure will be economically applied to the cultivated crops. As a matter of business, it is not only desirable to derive this indirect profit on the hay and pasture through the succeeding crops of grain, but if possible to make a paying investment on the animals to which the hay is fed and with which the pastures are stocked.

It is a noticeable feature in Central Illinois that few small farms produce beef, the eighty acre farms almost never have a two-year-old steer upon them. Grazing steers are almost as rare on the one-hundred-and-sixty acre farms,

and are not common on the half-sections. It is chiefly upon the farms of sections and larger, that are to be found pastures stocked with beef cattle. The causes for this may be explained. Deducting from the value of the average summers growth of a steer at the usual prices paid for stock cattle, the risks of death and other losses, herdsman's care, fencing, interest, etc. and there will usually remain an equivalent to a fair rent of the land. Good farming land in Central Illinois, devoted to pasturing beef cattle will usually return about the same amount of rent as the same land would bring if rented to a good tenant farmer. Owners of small farms cannot therefore afford to graze beef cattle. Usually they have not land enough, much less rent out a part of their farm, even though they rent it to cattle. The same is true of renters. I think my hearers will, from their own observation, concur in my statement that not more than one per cent of the tenant population of Central Illinois are either feeders or grazers of beef cattle. It is a business that is generally unprofitable for them. They cannot afford to hire land at the current rates of rent, pasture it with beef cattle, and derive a profit sufficient only to pay the rent.

The condition of the large land owners is different. With farms too large or disconnected for constant personal supervision they seek a system, of farming that requires the minimum of human labor. Beef production is the business that most fully meets their needs and as such usually proves the most profitable for them.

Being therefore practically cut off from beef production the smaller farmers and renters must look to some other kind of live stock to assimilate their grass crops and if need be give employment to their usually larger proportion of labor force. Then it is that dairy cattle have a place; for they more than any other kind of live stock fully meet all the requirements. It is not only mine but the experience of many other dairy farmers that with the same amount of labor pasture land devoted to dairying will yield the same amount of income as the same land devoted to any of the grain crops, wheat, corn or oats; also that dairy cattle will through the year give a profitable employment to as much labor and will yield an income, acre for acre, equivalent to the income from the labor bestowed upon crops of wheat or corn if raised upon the same land, and in addition to this will so add to the fertility and mechanical condition of the soil that the succeeding grain crops will frequently yield fifty percent and in some instances double what is usually produced by continuous cropping. In dairy cattle therefore we have a kind of live stock that is profitable where land is scarce and hard to get; for with them we may accomplish the double object of recuperating and deriving a reasonable profit from the high priced lands. A systematic rotation of crops is peculiarly adapted to the farms of central Illinois. There is a great uniformity of soil. The soil of one field is just like the soil of every other field; so that a system of crops that is adapted to one field is adapted to the whole farm. There is also no waste land so that there may be a division of the farms into equal fields of the same number as there are courses in the rotation.

The grasses used in a rotation should be such as are best adapted to making a desirable change with the cereals. Perhaps there is no forage

crop more eminently fitted to restore worn out grain lands than clover. Being of an entirely different order of plants as well as its habit of leaving the ground richer in available plant food, suitable for wheat or corn, and also leaving the soil in a condition of fineness that makes it peculiarly easy of cultivation. Clover becomes one of our most valuable plants to use in alternation with wheat or corn, aside from this it is by no means an unprofitable crop to raise. Two crops in a season is almost a certainty and a third crop a possibility, at least there will always be a rich aftergrowth and it seems to thrive as well if not better on lands so worn and foul as seemingly capable of producing nothing but weeds. This clover, so valuable in the rotation for retaining the soil's fertility is one of the most valuable of fodder crops to the dairy farmer. Next to grain there is perhaps no dry feed better relished by the cows or capable of producing a larger quantity of milk of superior richness than well cured clover hay. Owing to these qualities there are few farm crops, wheat and corn not excepted, more profitable to raise upon a dairy farm.

In this paper I have thus far endeavored to show that on the high priced lands in central Illinois, in order to conduct a profitable business and withstand the competition of all the rest of the world the farms should be so managed as to be kept up to the highest possible state of fertility. To accomplish this there should be practiced a systematic rotation of crops of which the principal factors should be pastures and meadows alternating with the cereals; also that the farms should be well stocked with such animals as of themselves prove most remunerative and as such dairy cattle have their place, especially on farms ranging from the smaller to those of medium size, not excluding the large farms and including the rental land.

But simply practicing a rotation of crops will not of itself retain the natural fertility. In addition to the rotation nothing short of manuring will retain or increase fertility. Not only the same amount of plant food should be returned to the land as is taken from it but it should be as evenly distributed over the ground as the plant food is before the grain crops are moved from the land.

Considering the price of labor, of fertilizers and other costs involved in the various methods of manuring land, that plan seems best adapted to central Illinois which consists in feeding grain to live stock. This brings for consideration the relative profits of the different kinds of live stock used for feeding crops grown upon the farm. Of course the profits of feeding any of the different kinds of live stock depend largely upon the relative prices of the feed and the article produced. In feeding hay, corn or oats to milch cows quicker returns are made on the investments than with most any other kinds of farm animals. The feed given to the cow one week is paid for in cash the next week. And the prices usually received for the grain and hay are much higher than the corresponding market quotations.

With a well-balanced system of farming there should be a sufficient number of cattle to consume all the corn, oats and hay raised upon the farm. The usually increased prices of dairy products during the winter month frequently make winter dairying even more profitable than summer

dairying, but the farmer will find no better market for corn, oats and hay than that supplied by his milch cows.

In central Illinois we have rich land, good markets, improved machinery, favorable climate, plenty of rain fall, good drainage—in short, everything calculated to improve the condition of men and make the agricultural population the most affluent of all our people. Notwithstanding all these favorable circumstances a large portion of our rural population are not prospering.

It is natural for industrious men, doing business, to gradually accumulate property and it is unnatural for the population of central Illinois, with their eminently fertile lands and other favorable circumstances, to make such small profits.

One great fault in our agriculture is idleness. I do not mean that we are a lazy people, but that our present methods of farming involve a large amount of idle time. Nearly every farmer has a considerable portion of his capital invested in agricultural machinery, each of which implements are needed to perform but a few days work each year. The farmer himself and the farm hands—the most costly of all his implements—are either idle or doing unremunerative work often as much as five months in the year. This is true in its strongest sense with strictly grain farms, lessening in degree as live stock or other industries enter into the farm management. This idle time on the part of the farmer is, of course a direct loss to himself. But farm hands out of employment are in fact paid for their idleness. These men must be supported. When they are employed the farmers are obliged to pay them at an increased rate sufficient to bridge over their seasons of idleness. Should the farmers refuse to pay these rates, the farm hands would seek some other employment thereby making a scarcity of labor—soon forcing up the price to at least what it costs a man to live a year. If two hundred dollars is a reasonable sum for an industrious man to earn during the year from which he supports himself and sets aside a reasonable profit; then in order to maintain such industrious men as farm laborers, that amount must be paid them per annum; and if the usual method of farming employs laborers but seven months in the year then the laborers must receive the year's wages for the seven months.

If by a general change in our farm management we could not only constantly employ such capital as we have invested but give employment to farm hands the year around we could both benefit our men and ourselves. We would receive a larger profit on the capital invested in implements and labor and could afford to pay the farm hands larger annual wages.

In considering the different ways of continuing farm work through twelve months in the year, no industry presents greater advantages than dairying, more land being devoted to pasture, fewer hands are required in the summer months to cultivate and harvest the crops of grain and hay; while in the winter months more labor is needed in feeding these crops and giving the cows the attention and care, feeding, milking and sheltering that so abundantly pay for the effort. No less labor would be used but it would be more evenly distributed through the year.

Another hindrance to prosperity under the present system of farming is the great uncertainty of the farmer's income. It is impossible for farmers whose chief source of income is from the sale of grain to make any previous definite estimate of the amount of their sales or even the time when this income will be received.

They are at the mercy of the winds and rains, droughts and frosts, in the determination of the amount and quality of their harvests and at the mercy of the still more fickle stock gamblers in the determination of the prices to be paid for these harvests as well as the time when their income may be received.

In many instances this uncertainty works disorder in the farmer's finances. It involves a system of credit; engenders extravagance and tends to looseness in business. The grocer, hired hands, dry good's merchant, implement dealer and many others are to be paid when the grain is sold. Not knowing with any accuracy the amount of his income the farmer is apt to overestimate his resources and too frequently live better than his income would permit. And in purely business trading the tendency is to make too many investments, on time, depending too largely on what the wheat or corn will bring when sold.

As there is a constant drain of little accounts so there should be a constant flow of income. In most business there are usually two classes of expenses, the large debts, as rents, interest, notes, etc., and the small accounts, as repairs, family expenses, extra labor, small cash investments, etc. There should be two classes of incomes to correspond with these two classes of expenditures. There should be an income of large amounts which may be uncertain in time and quantity such as the sale of grain, cattle or horses; and there should be an income (of small amounts—the larger the better) coming in at regular and short intervals—once a week or once a month—and should be received punctually and in previously ascertained amounts.

Of the many ways of conducting a farm there is perhaps none which more evenly distributes the income as to meet the many expenses of the farm as does dairy farming. The sales of milk or its products are made at least each week or month and may be easily estimated from the previous week's sales and from these sales most of the smaller expenditures may be paid, while the sale of cows, calves, or hogs make up the larger sources of income.

Every business in which a people engage bears more or less upon their political history. In communities where beef production forms the principal feature of their agriculture the tendency is to decrease population. The beef producers as they increase their wealth extend their domain; buying up the land of the smaller farmers and turning these before inhabited lands into pastures.

The wealth of a country depends more upon the number of its industrious people profitably employed than upon its herds of cattle and horses, rich lands or improvements. To augment the wealth of a community the number of its industrious people must be increased.

Of our various agricultural industries those requiring the least number of acres to support a family will usually be found to be such as most speedily

increase the general wealth of the community. The more numerous the farm families the greater will be the demand for merchants' goods, making such business more prosperous, and they in turn making a larger demand for the agricultural products make the market for such products sufficient for the increased supply.

The tendency of dairy farming is to sustain the smaller farms and give the farmers of more limited means the competence to successfully compete for the possession of the land with others of larger means.

Whatever systems of agriculture tend to decrease the size of the farms, also have a tendency to do away with the system of renting land and to increase the number of owners occupying their own lands.

Take from him the ownership of his farm, and the farmer not only loses all pride, interest and ambition to improve it, but he takes but little interest in the general welfare of the neighborhood. He gives but little thought to the town elections, and but little attention to the schools, roads, fairs, or other objects of public interests. And the rented farms themselves seldom reflect value upon the neighboring lands. Orchards, ornamental trees, fine barns and dwellings are improvements rented lands seldom add to a neighborhood. Any industry that gives a farmer of fewer acres the ability to compete successfully for the possession of the land becomes the means of increasing the number of land owners as well as increasing the number of homes.

Many parents feel with regret the departure of their young men for the cities or to the west, to earn a living. They sorely feel the need of some way of farming that will simply remunerate their boys for their labor and furnish an occupation upon which these young men can profitably lavish their enthusiasm and enterprise, and by which they may steadily accumulate property for themselves, and ultimately branching off from the old homesteads, establish themselves upon farms of their own. In order to do this with our steadily increasing value of farm lands we must pursue such systems of agriculture as will profitably employ more yearly labor per acre. We must carry on a higher system of farming. With the same amount of labor applied to one acre as is now ordinarily given to two, there should be produced upon the one as much as is now produced upon the two. This requires intelligence and skillful management.

Perhaps I have named enough of the advantages that may accrue to many farmers of Central Illinois were they to adopt some of the many forms of dairying. But as most of us farm to make money few of us will engage in or continue the business of dairying unless we are satisfied we can make as large profits as in other kinds of farming. In Central Illinois we have a remarkably good home market. We have many large cities and towns containing a large class of citizens who are willing to pay a first-class price for a first-class article of butter, cheese or milk. Also the southern cities almost always furnish an active demand for the best grades of dairy products. We being nearer than our friends in the north to this southern trade, gives us a better chance to successfully compete for this market. As far as good markets are concerned we are as well situated as any portion of the state.

Our climate is good, the summer months being sufficiently long to ensure us at least seven months of good pasturage and our extremely hot weather is not often so protracted as to materially interfere with the manufacture of butter and cheese.

Being in the midst of the beef producing industry we find a rapid sale and at high prices for all calves not suitable to use in the dairy. Our rain fall is usually sufficiently abundant as to rarely permit us to suffer from drought and the drainage is good enough to prevent an excess of wet land; while we have but few springs there is ample supply of water to be obtained from our deep wells.

The manner of conducting dairies in central Illinois will always depend upon the varying circumstances peculiar to the different localities. In communities where the farmers live at no great distances apart and the people generally engage in this business, the co-operative systems will usually be found most expedient.

But in localities where but few of the farmers engage in the business so that many largegrain or meat farms are interspersed among the dairy farms, making the distance to the creameries very great, co-operation in most any form becomes almost impracticable on account of our periodically muddy roads. During many months of the year, on account of our sticky, muddy roads, the cost to many farmers of delivering the milk to the factories is larger than the cost of manufacturing the milk into butter or cheese. To this hindrance is probably due more than to any other the backwardness of the dairy industry in this portion of the State.

Under the existing circumstances of periodically bad roads as well as the isolation of the dairy farms due to the large number of grain and stock farms, the most practical way at the present time, at least, for farmers to engage in the dairy business in central Illinois is to manufacture the milk products upon the farm, making butter only and using the skim milk for raising either calves or pigs. Such farms would form the starting points of co-operative creameries, as other farmers of the neighborhood become induced to engage in the dairy business.

To be successful in the dairy business a farmer engaging in it should provide himself with cows such as yield butter in the largest amounts and of the best flavor, texture and color, and also with appliances best adapted to making butter with the greatest ease and of the finest quality, and unless he provides himself with the best apparatus and uses them so as to produce first-class products, he would better not engage in the business.

The cows should not only be capable of making large amounts of good butter, but should also be persistent milkers. Comfortable quarters should be provided for the cows, both in summer and in winter. Ample amounts of feed should be provided such as the cows relish and such as prove the best for producing butter. With good cows, good feed and good shelter, good milkers and careful hands should be employed. The management of the milk should be with the best appliances and in accordance with the most approved methods. The person who makes the butter should so far be relieved from other cares as to consider the care of the milk as the principal work.

While the dairy room need not be expensive it should be fitted up with

such conveniences so that the person who attends shall have every facility for performing the work rapidly and with ease. Perhaps the cause for most of the drudgery in dairy work as well as the cause of so much inferior butter may be summed up in the one word inconvenience.

When every appliance is of the proper kind and properly arranged, butter making is the simplest, easiest and perhaps pleasantest of employments. The butter will almost make itself and it requires as great an effort to make poor butter as it does with inconvenient appliances to make good butter.

The final step in such dairy business is to sell the butter. If the butter is gilt-edge, the demand will seek the supply. As soon as it becomes known that a farmer is making fancy butter, purchasers become very plenty, and the farmer may depend upon getting the highest market price. There are different classes of customers, among which may be mentioned private families, store keepers, and commission men. Selling to private families is often a troublesome business. It involves a great deal of labor in delivery, more or less risk in collecting payment, and often involves many petty vexations.

One of the most satisfactory ways of selling butter from a small dairy is to make a yearly contract with some reliable grocer, in the nearest large city, for a stated number of pounds to be delivered each week at a fixed price per pound. When such contracts are made care should be taken not to stipulate to furnish more butter than can surely be supplied during the months when the least amount of butter will be made. By adhering strictly to this rule, purchasers will soon learn that a regular supply of butter may be depended upon, even in times of great scarcity. This confidence on the part of the purchaser will often add to the price the farmer may be able to command for his butter. By making contracts in this manner, there will necessarily be a surplus during the flush seasons. Such butter may be disposed of to any reliable commission man.

Dairying, if more generally practiced by farmers of Central Illinois, will have an influence to enrich the land, by which larger crops of corn, wheat and oats will be grown; the farmer's working capital will be employed during more months in the year; the farm labor will be more evenly distributed through the year; a steadier, more certain and larger income will be obtained; the tendency will be to increase the number of farms, as well as to increase the number of families; profitable employment at home will be furnished for the young men and women; our country would be improved by the erection of better agricultural buildings; and last but not least, many who are now doing a barely profitable business, would receive the full reward for their intelligence and industry.

MR. HALL: I want our friends who have come in here from northern Illinois, as I have, to know that the two papers to which we have just listened are from graduates of this University, and I believe they are the first papers presented to this Association by graduates of this University, and I for one, hope that those who have the making of our programs will reach out for such young men as these. The infusion of new blood will be a good thing for us, and we shall be made to feel that this great institution at Champaign is nearer to us than we knew it to be before.

PROF. MORROW : I wish to say that the third paper on the program for this morning is by Mr. Hunt, who is also a graduate of our University in the agricultural department, and who gave me most valuable assistance in the management of the farm. Mr. Hunt is himself in New Orleans in the interest of the state exhibit.

The following resolution was offered by Mr. Buell and adopted :

Resolved, That this Association respectfully petition the honorable members of the Senate and House of Representatives of the General Assembly of the State of Illinois for the appropriation of one thousand dollars (\$500 each year), for the use of the Illinois Dairymen's Association, to be expended for the objects of the Association in accordance with the provisions of the charter of that institution.

Resolution offered by Mr. Buell by request, and adopted :

Resolved, That the Association respectfully request the Governor to recommend said appropriation by the General Assembly by message in the usual manner of such recommendations.

REPORT OF COMMITTEE ON NOMINATIONS.

Your committee on nominations beg leave to report as follows :

FOR DIRECTORS : H. B. Gurler, Dr. Joseph Tefft, S. K. Bartholomew, J. H. Broomell, L. M. Potter, J. L. Whitbeck, C. F. Mills.

REPORT ON ADULTERATION.

WHEREAS, The manufacture of oleomargerine and butterine has assumed a magnitude of considerable importance, in the State of Illinois, and the deceptive manner in which it is placed upon the market is a fraud upon the public, as well as destructive to the dairy interests of the State,

Resolved, That this organization will demand of the legislature about to assemble the enactment of a law framed with sufficient wisdom if possible, to protect the consumer of butter and incidentally to foster the interest which we represent.

Resolved, That in our judgment one of the most effectual means to accomplish this end will be to incorporate into such a law a provision, for the appointment of a State dairy commissioner with proper assistants whose duty it shall be to enforce it.

Resolved, That a committee of three be appointed at this meeting charged with the duty of carrying into effect these resolutions.

J. H. BROOMELL, Chairman.

Report adopted.

WHEREAS, Agriculture in all its various branches is the predominating industry of the west, and most assuredly of much more importance relatively, than in the manufacturing east; and,

WHEREAS, The agricultural resources of the west are so much greater than those of the east must be considered as the greatest food-producing country in the world, be it

Resolved, That it is the sense of this meeting that if any office in the gift of the National government belongs to the great west, it is that of Commissioner of Agriculture. Further that it is the sense of this meeting that the office of Commissioner of Agriculture should not be given to a mere politician, or to a broken down political hack, but to a western man, who is a practical and successful agriculturist and stock-raiser, a man thoroughly conversant not only with the resources of the great west, but also with its wants and needs, a man in whose practical ability and integrity the whole country can have implicit confidence.

MR. LAWRENCE: I wish to extend an invitation from the people of Belvidere to the people of this Association to meet with them next year.

Mr. Whitbeck read a communication from numerous citizens in support of the invitation.

MR. BUELL: I move that this communication be received and referred to the directors of this Association for their favorable consideration. Motion seconded, put and lost.

MR. BUELL: I would now move that all invitations for the Association for the meeting next year be referred to the board of directors for their careful consideration, and that they make such selection as shall be for the best interests of the Association. Motion seconded.

Convention adjourned to meet at 1.30 o'clock P. M.

FRIDAY AFTERNOON SESSION.

Convention met pursuant to adjournment at 1.30 o'clock.

THE EDUCATIONAL NEEDS OF FARMERS' SONS AND DAUGHTERS.

BY C. C. BUELL, ROCK FALLS, ILL.

The term educational, as used in the title, refers to school education. Contrary to the implication possibly contained in the form of statement of my subject, I desire to disclaim the idea that the sons and daughters of farmers are entitled to receive or should receive, so far as their general education is concerned, any different training from what the children of other classes of citizens are entitled to receive. There is perfect homogeneity in the character and mental endowments of children, and the state has no right to discriminate. The possibilities of growth and development are the same to all, and in the nature of our free institutions the avenues to wealth, preferment, and distinction of every kind are open to all alike.

The obligations of the State toward all these children are precisely the same. They arise from the same sources, and rest upon precisely the same arguments. These arguments proceed, not from the claims of individuals or classes of individuals, but from the necessities of the State itself. When the necessities of the State become known its duty is clear. Logically and chronologically considered the duty precedes any just claim that can possibly be set up. The State educates because it is its duty to itself so to do, and in the discharge of this duty it is bound to consider all the forces, intellectual, moral

and industrial, which go to make up its greatness and to perpetuate its prosperity. Intellectual and moral fitness are essential qualifications in order to the effective use of the ballot in self government. Industrial thrift based on the most effective use possible of natural advantages possessed, is the key to the prosperity of the State and the advancement of the people in civilization.

The proper field of this discussion thus becomes pretty clearly defined, and I venture some remarks partly by criticism of existing methods and partly by suggestions, on the lines of thought already indicated.

The public school system of the State seems almost exclusively directed to the intellectual training of the youth, and in this specific field may be accounted fairly successful. The stream cannot rise above its source, and considering the money and other agencies available I do not see how greatly improved results could reasonably be expected. The intelligent observer of forty years past will notice that booms and crazes have characterized the work of the school room as well as other departments of industry. Some of these have intrinsic and permanent value. Others may be accounted indifferent or hurtful. It will be noticed however that almost all consist only of some new form of application of an old principle familiar to and practiced by the skillful teacher of every age. Sir Wm. Hamilton, the highest authority probably in this field of enquiry says: "The primary principle of education is the determination of the pupil to self activity—the doing nothing for him which he is able to do for himself." The whole machinery of schools and teachers thus becomes to the youthful mind as the stick to the rocket. Properly balanced, directed and ignited, it shoots toward heaven with brilliant effulgence; misdirected, it grovels to earth carrying consternation and destruction in its path. The value of school training is apparent in almost all cases in which it is enjoyed, but its essential benefits may be attained independent of school advantages as illustrated in the case of many self made men. The Greek proverb reads: "If you love learning you will have learning." And here I desire to enter my protest against many of the so called easier processes which to a considerable extent have taken the place of the more rugged paths in the mastery of a given subject. These for the most part substitute mere receptivity and memorization for the more strengthening exercise of analysis and independent inductive reasoning. English grammar is taught, or rather *not taught* in "language lessons" so called. The cross roads school teacher flouts Lindly Murray and Gould Brown, and insists that the best rules in mathematics are the ones the pupil makes for himself, although it is probably notorious that neither teacher nor pupil is able to frame an intelligent statement of rule or principle. Nay more, eloquence and learning are sometimes evoked to ridicule the slow and plodding paths through English, Latin, and Greek grammar; through Cesar, Cicero, Xenophon and Homer, by which intellectual power and distinction were formerly acquired and by which the critics themselves have attained to the power of eloquent invective which they now turn upon these slow and laborious methods. Let us see the fruits of the so called better methods and then it will be time to discard the old.

I am not among those who believe that the farmer has been particularly

slighted in the work of the public school room. It is possible that in mathematics a larger proportion of illustrative examples might to advantage be drawn from transactions incident to business on the farm. Instruction in the physiology and anatomy of domestic animals might profitably be made more prominent, also the study of chemistry and botany as illustrated in home experience. But all these things I think have a more appropriate place under the head of learning as culture, than in the practical arts. The chemistry of bread making may be very interesting for those who have a taste for this kind of investigation, but the farmer's daughter, I suspect, will not very much improve the loaf through this knowledge. In this case as in many another which is made the subject of a fine turned phrase, the value of the practical art will partake precisely of the science. Webb Clifford, in *Nature's Serial Story*, as recently published in *Harper's Magazine* is a possible character but it is not likely to be a very common one.

Let us next consider the educational needs of the youth from a moral standpoint of view. What is being done in this field, and with what result? Is the standard and practice of practical morality, as illustrated, the social, commercial and political intercourse of the people rising, descending, or is it at a standstill? I ask this question not as a partisan of any kind, either political or religious: and, furthermore, I will not undertake to consider it. In all conscience the standard is low enough, and the more practical question is, what can be done to improve it? I am one of those who believe the schools should be utilized more effectively to this end than is now done. You ask how? Are not the churches watching with jealous eye the conduct of every Christian teacher lest he may use his influence more to the advantage of his own sect than of another? I am pointed to the Sabbath schools of the various religious denominations as working in this field, to say nothing of other religious effort. Without criticising these, the best organized agencies for inculcating moral truths now existing, there are left a vast number who are not reached by these means at all, or if at all, but imperfectly. These agencies only partly accomplish the proposed object as shown by the statistics of crime, and by the exhibitions of crime and immorality both inside the court-room and out. The degrees of immorality below the actual violation of the law are scarcely taken notice of, and there is no systematic training of the young in the fundamental principles of right and virtuous actions. The influence of the public schools is almost neutral so far as positive teachings are concerned.

Let morality and thorough honesty, then, be taught for their own sakes in every school-room. Let this be done in a prescribed and systematic way without special reference to religion or any religious sect whatever. Every theologian recognizes the obligations to right action as dictated and enforced by the conscience independent of religious incursion altogether, and all admit that the conscience, quickened or unquickened by religious emotion, is not made influential in controlling human action chiefly through the power of habit.

Let catechisms and text-books, then, be placed in the hands of both teachers and scholars; illustrating and enforcing the obligations and rewards of right conduct in the various circumstances of life, and setting forth the

hatefulness and meanness of wrong-doing. This need not and should not be done to the prejudice of any religion or any theology. Nay, even, it should constitute the seed that, under the influence of religious culture, may grow up and be made to flower into the beauty of holiness. I believe that under such early systematic and continuous instruction the moral character of the teacher class would be improved by the performance of the duties imposed, the strength of correct public opinion be increased, the power of conscience among the masses in determining toward right action would be strengthened. The record not only of illegal vices, but of little meannesses as well, would be shortened. The amenities of social intercourse would be increased, the honorableness of men in ordinary transactions would become more habitual and general, and even the slough of political nastiness and meanness be dried up by making it unprofitable even in fishing for votes.

I pass to the third branch of this discussion, viz.: The proper scope and end of industrial education: Industrial thrift is a necessity to the state. Wise statesmanship will therefore guard jealously every influence tributary to it. Material prosperity is the basis of every other kind of progress; without this every other claim to progress is poetic and sentimental. It is like love in a cottage, or fine art in a hovel. These are possible circumstances, but culture and refinement will soon bring about a betterment of material surroundings or succumb to their depreciating influences.

Again, progress in civilization means progress of the masses—progress along the whole front of society's battle line. Phenomenal cases count but little, or are positive drawbacks. A thousand capitalists with a thousand dollars each, the income from which is united to industrious effort in supplying family wants, furnishes an example of material thrift, social power, progress and stability not at all to be compared with one capitalist with a million dollars employing a thousand hands at so much a day. Henry Ward Beecher was many years ago credited with the remark that wealth, like snow, was a good thing when evenly distributed, but bad when lying in drifts. Happily the foremost industry of our state is favorable to the comparatively even distribution of wealth; I mean agricultural industry. It constitutes a kind of strength most unvarying, and the least affected by economic changes and financial disasters. Without question it is for the interest of the state, without prejudice to the claims of other industries, to use its power in every legitimate way to strengthen and make efficient this natural source of its greatness and power. Encourage and make efficient the labor of nearly half a million agriculturists of the state, and the derivative interests, so to speak, will of necessity prosper. It is the story of the fabled giant illustrated; when he touched his feet to earth he was strong and irresistible, elevated above it he was weak and powerless. What, then, is the theory of profitable, industrial education? Evidently every farmer's son and daughter cannot become a scientist even if tastes and aspirations looked that way.

The most learned farmer, technically speaking, is liable to be about the least successful practical farmer, and the most unprofitable kind of farming is experimental farming. The scriptural injunction is, "Prove all things; hold fast that which is good." The practical farmer should not bother

himself very much about the first part of the unjunction, as applied to farming but hold fast to the good with firmest grip. He can do the first part by proxy, and that is just what we want such institutions as the Illinois Industrial University for. At least that is one of the things. My observation of honest, money making men, is that he who *catches on* to a business, or a mode of doing business which gives a sure margin, and who *sticks to it*, in the end acquires a competency. Better not test new theories or untried practices until financially strong enough to bear a loss if it come. The practical end of education and learning is to place actual work on the solid basis of scientific principles. The farmer's son learns to plow corn best at home; the daughter, to make bread in her mother's kitchen. Shall we not have manual labor, then, in industrial schools? No; except for illustrative purposes, and for purposes strictly educational. I regard the argument that it serves to dignify labor or that it begets a love for work mere moonshine. The influence of mere sentiment or pride undoubtedly often has much to do in determining a young man's vocation, and so has laziness, but these affections are to great extent constitutional and seldom yield to nostrums of any kind.

I think we are ready, and it is certainly time—to summarize the needs of farmer's sons and daughters in respect to education in general and industrial education in particular.

First, in addition to common school and high school training let them go through college if they aspire to this and it is practicable. What for? you ask. To make intelligent men and women of them. Not a single branch named in the ordinary curriculum of a college course is studied beyond what is necessary in order to master the elementary principles of the subject. Leave out Greek and Latin and German and French if you want to, and substitute something else. Do this especially if there is no taste for these studies, and leave out the whole course if there is not intellectual aptness for it, and let the boy or girl engage in actual business at once. It is folly to attempt coaxing the horse to drink which is not dry. Every one of these studies fills a valuable place in making a man of culture; in fitting a man for positions of high trust and honorable public service. Can a young man make any more money by it? Perhaps not; but he can enjoy what he does make rationally. A man might about as well cultivate obesity as to acquire money which he enjoys as a mule enjoys a mess of oats drawn from a great store house. Go to his home. It may be elegant and costly, or not so. You find no papers, no magazines, no books, or, if you do they are not read. Very likely there is no taste for reading. Such men frequently have great gift for making money but seldom have benevolence or wisdom, or liberality in bestowing it.

Second, if farming is to be the practical business of life the special studies relating to the various branches should be mastered. There is demand for educated men of ability who master and have a taste for these studies. They may never buy a steer, milk a cow, run a mower, or hold a plow. But if not it will be because they are doing figurative plowing of a higher order. The world will be more productive for their labor, if true to the principles of their education. It may be a case of the boy leaving the farm; but what the farm may lose, the world will gain.

In conclusion, if it be said I am too conservative or old foggyish, I cannot help it. I look through the medium of my own experience and observation. The operations of nature are often carried on with great sacrifice of material, one seed in a thousand perhaps developing to the reproductive stage. I offer this discussion as a seed thought to take its chances among the forces struggling for the world's government.

MR. BUELL: I desire to express the delight which I experienced in my visit to the University yesterday. It was my delight to see illustrated what I believe are the very truths which I have tried to enunciate in the paper which I have read. I believe that every college in the University is valuable in this way. I have nothing to say about a college which is organized on the plan of Harvard or Yale, or Amherst, and the numerous other schools which I might mention whose recitation rooms are filled with boys whose parents believe they are important for their future success in life. Why, in this group of colleges should you omit that one; why, it seems to me you are destroying the proportions in doing so. Many a boy will come through the school here; his tastes lead him through a very different course from what his father pursued; if his father happens to be a doctor or a farmer, it is no sign that he will be the same. Give the boys an education, let them know the elementary principles upon which they can base a career for any one of these courses of life, and they will find it. Only make strong men of them intellectually, morally and physically, and they will find their place.

MR. HALL: I indorse all Mr. Buell has said since he folded up his paper, but I do not agree with him when he says it is folly coaxing a horse to drink that is not dry. My friend will know that I could not hold my position as a teacher one year if I did not have the boys who leave me inspired with a desire to get higher, that they would not have had, if they did not come to school, because coaxing is what teachers are paid for. It is making the horse dry that is our work. As to the moral question, my friend must not think that all the teachers of public schools in this state have not considered that question over and over again. If it was an easy one to solve we would have solved it long ago.

MR. BUELL: With reference to the horse drinking, remember I said the work of education is to set ablaze the elements which are in the soul of the pupil. If the horse had a taste for the water, you would not need to bring him up to it; you cannot create these elements of taste.

PROF. MORROW: Give them salt.

MR. BROOMELL: I think that Prof. Hall has been doing just that thing, giving his boys salt.

BREEDING AND FEEDING, FOR THE DAIRY.

C. H. LARKIN, ELGIN.

In' discussing a subject so fundamental in its character, one will encounter many vexed questions chiefly because of the ignorance of substantial, practical facts based upon carefully and intelligently conducted experiments; vexed by the conflicting interests of rival breeders; vexed by the hope that there may yet be found that, to me, unknown breed, that excel in every-

thing to be desired in a dairy cow. There may and doubtless does exist to some extent that combination of good qualities in a *horse* that entitles him to the appellation of Horse of all work, but the existence of any breed of cows of corresponding qualities may be gravely doubted.

There have been many efforts in the mechanical world to construct a machine adapted to a variety of uses but usually with unsatisfactory results: "Jack at all trades" may be a convenience at times but for best results we usually prefer one of less versatile accomplishments.

The "Ne Plus Ultra" of cows as a distinct breed that are No. 1 for milk, butter and cheese, and beef, have thus far failed to materialize.

To my mind the practical idea underlying this question is that which regards the cow as a machine—a machine to convert the grosser and bulky products of the farm into dairy goods; a kind of condenser that concentrates value with the least waste.

Starting then with this as the leading thought we are at once confronted with numerous questions such as soil, feed, climate, proximity to or remoteness from market, as well as taste and prejudice on the part of the owner and very many other considerations affecting the selection of dairy stock.

Notwithstanding the considerable variety of soil and climate owing to the length of our State from north to south, they are of no considerable importance in the adaptation of any breed to different parts of the State and then too, the *quantity* of milk yield may be largely eliminated from the estimated value of different breeds of dairy stock, since butter and cheese, or quality and not quantity is largely and will long continue to be the standard of excellence.

Just here let me enter my protest against the almost universal custom of weighing or measuring milk as a *sufficient* means of estimating value; beside being manifestly unjust it constantly presents inducements to fraud. True, this association has, I believe, adopted a standard, but it amounts to but little so far as practice is concerned. Returning to the thought that the cow is a machine with which to convert the cruder products of the farm into dairy goods, it at once becomes pertinent to inquire not what *cow or breed* of cows will under peculiarly favorable conditions yield the greater amount of these products, but which will convert a given amount of such feed as the owner may most economically furnish, into the most and best product. Or in other words what class of cows will return the largest per cent on the amount invested; the true measure of excellence being in net rather than in gross receipts. It may frequently be noticed in localities where the spirit of strife runs high as to who should produce the most milk from a given number of cows that the *profit* does not always compare well with the amount of milk produced.

If then we find that a class of cows from their large size or grosser habit on the one hand or delicacy of constitution on the other require a larger expenditure for either feed or care in proportion to the return made, the average dairyman will not long hesitate what to use.

The question abstractly may for convenience be divided as relating to size and breed, but practically they so merge as to become but one.

I think it generally conceded that with all domestic animals the conditions of age, flesh, disposition, exposure etc., being the same, the amount of keep required is very nearly in exact ratio to their weight. While this rule may have many exceptions as to individuals, it is true regarding races.

Coming now to the more difficult and as yet undetermined question, do larger cows yield as much milk, butter and cheese one or all, as small ones?

It would seem that the dairymen of Illinois have a right to and do expect an intelligent and decisive answer to this question from repeated tests right here where ample means have been provided. It will hardly be expected that any private individual will have, or can, so thoroughly experiment as to satisfactorily answer this and very many other questions of vast importance to the dairy interest.

Mr. President, while I may not be losing faith in tests and experiments, I am coming to have more in the results of personal observation of careful, painstaking men, men freed from the bias of self-interest, men who are willing to help their fellows by exchanging the results of their observations because they have something to say, rather than a desire to say something. Holding to this view I have tried in a small way to collect and compare the result of some observations in the dairy region about Elgin.

Of several breeds competing for excellence, the writer has had but little acquaintance except with the Holstein, Ayreshire and Jerseys, though an experience of several years with a family of Short-Horns was eminently satisfactory. Of these the milk of the Jersey seems particularly adapted to butter making, giving it a fine color. So marked is this characteristic that a few cows in a dairy will impart to the whole product a desirable tint. While a limited number of these might be desirable for a strictly butter dairy it is quite doubtful if a considerable number would be profitable in the hands of the ordinary dairy farmer.

The Holstein or Dutch cattle which seem to be growing in popularity just now are large heavy cattle, somewhat inclined to coarseness and require a full supply of succulent food. While conceded to be the heaviest milkers, their milk does not yield so large a per cent of butter as a rule, but seems to be particularly adapted to cheese, and are to be commended where feed is abundant and a large flow of milk or yield of cheese is desired. Of the list enumerated the Ayreshires seem to most completely fill the bill, where both butter and cheese are desired—being of fair size and easy keepers; they may be readily converted into beef of fair quality. There is this objection, especially where men do the milking. As a rule the teats are short; but judicious breeding will greatly obviate this objection. Having determined the breed best adapted to the end sought, nothing is of greater importance than singleness of purpose. Let purity and excellence be the guiding star of the breeder. Nowhere should the survival of the fittest more markedly obtain.

True, by painstaking a very excellent herd may be obtained even among native or common stock, and to some extent may the good qualities be transmitted to descendants, but the element of uncertainty will prevail to a far greater extent than where recourse is had to pure blood as the foundation.

It has been a repeated experience that a heifer of common parentage is not as good as the mother. A word here lest it might be inferred that while a constant effort at high grading should be maintained, that a crossing of pure blood is desirable. To my mind such a course in the hands of any but a scientific and experienced breeder would largely result in dissatisfaction. No native or grade can in the nature of things differ more radically from a thoroughbred than a thoroughbred of another breed. Let me again urge that whatever selection be made it be strictly adhered to, or entirely abandoned.

As an important adjunct to breeding for the dairy, stands the matter of feeding. As in many enterprises small matters may have more significance than we are at first disposed to give them. Feeding for the dairy when taken in connection with breeding should receive early attention.

While conditions of thrift and growth are to be duly regarded, let this fact be constantly in mind, that the future of the calf for dairy purposes is to be a machine to convert coarse bulky substances into articles of human food, instead of being so converted. Feed but little grain or concentrated food, for the result will be an animal that will not thrive well on pasture or hay without it. All concede that grass contains in largest measure the proper ingredients in right proportions for best dairy results.

The great difficulty is to get a machine capable of digesting and assimilating a sufficient amount of it either as grass or hay. Let the food of the young animal be such as shall tend to develop a capacious stomach and good digestives. To do this skim-milk may be early substituted for whole milk, and bran with grass or finely cured rowen after weaning.

As already intimated, nothing excels grass for summer feed and to secure this for the longest time there must be a succession, both in order to have a variety and to prolong the grazing season, by having those grasses that mature at different seasons. These are best secured by permanent pasture.

The writer has often thought that if he were to commence a dairy farm on virgin soil he would not allow a plow to disturb the native sod, but with the aid of a sharp harrow or scarrifier would secure a setting of a variety of grasses, trusting to nature's law before referred to, "the survival of the fittest," to secure permanency and adaptation.

For winter feeding, while maintaining the same general standard, a change will be required corresponding to changed conditions.

While no inflexible rule can be laid down, this general one may be used as a guide—that all rations should contain, in available form, nitrogen and carbon in about the proportions of one of the former to five of the latter, such being the proportions in early-cut and well-cured hay.

While a majority of dairymen, like myself, are incapable of making chemical analyses of any of the articles used for food for stock, those that are capable have furnished some facts which we may make available. E. W. Stewart, in a work on Feeding Animals, has given a number of rations several of which seem well adapted to the West, containing, as they do, that which is easily attainable. Among the articles mentioned, and which the writer has, in an experience of several years, found most satisfactory, are

early-cut timothy, clover and hungarian, in connection with carefully cured corn fodder (sweet corn much the best) for coarse feed, while for grain nothing equals corn and oat meal with wheat or rye bran in about equal proportions of the first two to one-half of the latter by weight, with an occasional addition of a limited quantity of oil meal. Should the time ever come when labor is as low in this country as in the old world, the growing and feeding of roots may be made profitable, but at present, especially in the more northern portions, this cannot be done. While feeding should be attended to with great regularity, a reasonable *variety* is desirable, thus furnishing as nearly as may be in winter, what stock find for themselves in summer, ever bearing in mind that the feed gives character to the product. Another important item, and one which is frequently overlooked, is that of regulating the amount to be fed each individual animal. While the coarser rations may be given without limit, it will pay to give heed to the powers of assimilation of each member of the herd. Whatever external appearances may indicate, there does exist a marked difference in the power of different animals to properly assimilate the feed given.

Especially is this true regarding the more concentrated varieties. As in everything, "Eternal vigilance" is the watchword.

REPORT OF THE COMMITTEE ON RESOLUTIONS.

Resolved, That we are under great obligations to the citizens of Champaign and their efficient committee, Mayor Day, Hon. E. E. Chester, L. W. Garwood, H. H. Harris and Prof. Morrow, for providing a suitable place in which to hold our sessions, and for many other courtesies.

Resolved, That the thanks of this Association be hereby tendered to the officials of the I. C. R. R., the Wabash and the I. B. & W. R. R., for passing our members over their respective roads at reduced rates; to the representatives of the press for their attendance and their reports; to the essayists for the excellent and practical papers presented; to Dr. Tefft, the president, and Col. R. P. McGlinchy, the secretary, for the efficient performance of their duties as officers of this Association.

Resolved, That we hereby express our thanks to the ladies and gentlemen who have added so much to the enjoyment of our meetings by the excellent music with which we have been favored.

Resolved, That this Association hereby acknowledges its obligation to Dr. Peabody and the corps of professors connected with the University of the State of Illinois, and especially to Prof. Geo. E. Morrow, for the kind reception given the members during their visit at the University, and that the reports which we will carry to our homes of this institution shall be such as will aid our friends in more fully appreciating the value and importance of its work.

FRANK H. HALL.

C. T. DEXTER.

PROF. MORROW: I am not a good man at paying compliments, and I shall make no attempt to do it. I rise to make a motion in connection with that report and to say a word. No man has done more for the dairy interest of the state; no man has had the ability to do that work more acceptably,

and with more willingness, than our worthy president. For years he has been active, as the increasing weight of years has given him the ability to be. I wish to offer this motion, that in view of the long continued and efficient services of Dr. Joseph Tefft, he be declared an honorary member of this body for the term of his natural life.

Motion seconded, and unanimously adopted.

PROF. MORROW: And now I want on behalf of a few members, as a very slight token of the esteem in which you are held on the part of the Association, to present to you this cane, which I hope you will not need for ten years to come at least, to help your steps, but that you may carry it as an honor.

DR. TEFFT: I am utterly surprised, gentlemen, that I should be presented with a cane as nice as this; I receive it with much pleasure and many thanks. I am too highly honored with the pleasure of being made an honorary member of the Association. I have been highly pleased and entertained since I came to Champaign; I have been glad to meet, and see, and get acquainted with so many good folks, so many men that are intelligent. I hope and trust that this may not be our last meeting; I hope we may meet hereafter at some time. I am getting advanced in life; I don't expect to stay here a great many years, but I enjoy working better than sitting down and resting; my life has always been a natural life from boyhood to the present time. I left home at seventeen years old, and since that time to this I have hoed my own way, and I have got along and sustained myself thus far. Now, I will be happy to meet any citizens that I have met here at my own home; I will entertain them to the best of my ability. I have been very happily entertained since I have been here. I shall go away bearing and retaining in my memory this meeting for all time to come.

DAIRYING IN SOUTHERN ILLINOIS.

BY H. C. BOUTON, ANNA, ILL.

In speaking for Southern Illinois, we take for our territory that portion of the State lying south of the Ohio and Mississippi Railroad, as this road is generally accepted as the dividing line between Central and Southern Illinois.

Our dairying interests are decidedly of a meagre character, as Southern Illinois farmers have given most of their attention to grain, stock, fruit and vegetable growing. Draw a line east and west from Carbondale, on the Illinois Central Railroad, to the Ohio and Mississippi rivers, and that portion south of the line will include the spur of the Ozark Mountains which extends from river to river across this portion of the State. Here is what is known as the great fruit and vegetable garden of our great State, one station alone last year shipping over 600 car loads of these products.

The soil of this section of Illinois is exactly the same as that of the famous blue-grass region of Kentucky, and the numerous ever-living springs of sparkling water which gush from the hillsides, give an abundant supply of what is so necessary in dairying, both for the cows and for butter making—pure water.

Our very short winters generally enable Southern Illinois dairymen to pasture their cows until Christmas.

Blue-grass, clover, red-top and timothy are at home here, and within the past ten years have been the means of bringing about a change that is really wonderful. Ten years ago a Jersey was a great curiosity to the majority of our farmers. Now we have very valuable herds in various portions of our territory, also several fine herds of Holsteins. The grasses, the pure water and the short mild winters make Southern Illinois one of the finest stock countries on the face of the globe.

We know of but one effort at operating a creamery in Southern Illinois. This was at Tamaroa, Perry county. But little expense was incurred in getting ready, as a building was rented for the purpose, and just as little machinery as possible bought. The butter made was of a fine quality, and brought a good price, but there were not enough cows in the neighborhood to make the enterprise a success. The expense of gathering the cream and operating the creamery soon greatly exceeded the receipts, and the stock company was only too glad to lease the establishment to a few enterprising parties near the town, who now operate it as occasion requires, their butter being shipped on orders to various points, including Cairo, Ill., and Little Rock, Ark. Some very valuable herds of Jerseys and Holsteins are owned in Perry county.

In order to give something definite as to the success attained in dairying in Southern Illinois, we take the liberty of incorporating some of the experiences of a few of our practical dairymen, which have been furnished us by them for this purpose. We first write of

MONROE COUNTY.

Col. Jos. Drury, vice-president of the Mississippi Valley Dairyman's Association has a magnificent farm at Waterloo, Monroe county, which is some 20 miles south of St. Louis, on the line of the St. Louis and Cairo Railroad. He says that the average number of cows used in his dairy since January 1st., 1884, is 21, from which he has obtained in eleven months 24,529 pounds of cream, yielding 6,965 pounds of butter, and at the same rate for December, the year's cream will be 26,758 pounds and 7,598 pounds of butter. (He also used and sold 325 gallons of milk not included in the above, which is equal to 140 pounds more butter.) An average of 365 pounds per cow, or one pound per day. His butter is sold at 35 and 40 cents a pound, owing to size of package, to private families in St. Louis, who are yearly customers. The butter nets him 33 cents per pound, or about \$120.00 per cow, not counting calves and sour milk fed to the hogs. Col. Drury has upon his farm a never-failing spring, the temperature of which stands at 56 deg. winter and summer. He sets his milk the year round in this water in deep cans; when the milk has cooled to a temperature of 56 deg. he closes the cans with tight covers. His cows are grade Jerseys of his own raising, and his mode of feeding is as follows: In summer uses mixed pastures and feeds a small quantity of bran at each milking. In winter feeds clover, hay and sheaf oats cut, and ground corn and bran; also sows corn, and cuts and feeds it green with bran in August and September in times of drouth. In short, writes the Col.:

"I feed well, winter and summer, and take the best of care of my cows at all seasons. Some of this may sound 'fishy;' but I expect to make my herd average 400 pounds to the cow next year and have no trouble in selling at my prices. Have now more customers than I can supply. I use no ice in my butter making. Ship the same day I churn."

WILLIAMSON COUNTY.

Our report for this county will concern the neighborhood of Carterville, a village a few miles northeast of Carbondale, Jackson county on the line of the St. Louis Coal railroad. The country is rather in the nature of a prairie. Mr. and Mrs. M. Richart are giving some attention to dairying, and as Mrs. R. was raised in the dairy region of the Western Reserve, Ohio, she is especially interested. She writes, replying to several queries:

"I think if we had the conveniences and appliances that modern dairy-men use, the climate would not interfere very much, as it is warm and wet weather which is very bad in butter making.

"Mr. R. thinks timothy and white clover the best grasses for general use—and considers red clover hay the best for cows. Sweet corn in the fall and rye in the early spring for pasture are great advantage. The poor water supply is our greatest disadvantages here. There are no springs in our part of the county; running water is very precarious; well water is plentiful, but it is a good deal of trouble to draw it, and in the busy season cattle do not get water as often as they need it.

"We shipped butter to Cairo three or four years, but last year the market was so overstocked we had to stop. The past summer we have been selling to one of the Carbondale hotels at 25 cents a pound. We have never milked more than five cows. They have averaged \$32.00 each. We keep Jersey grades altogether."

UNION COUNTY.

Anna and vicinity in this county, has more dairymen than any of the adjoining counties. Being only 35 miles north from Cairo on the Illinois Central Railroad, and situated high and dry among the charming hills and beautiful, prolific valleys, with sparkling springs and streams rippling over beds of gravel, it is a most suitable location for successful dairying operations.

The leading dairyman is Mr. H. T. Eastman, who supplies Cairo customers, as well as a home trade. Under date of Dec. 31, 1882, Mr. E., writus as follows:

"The first year of my experience in keeping a dairy in this State, I kept a strict account of the expenses and profits, and I found that during the year the cows had made an average of 220 pounds of butter per cow, and the sales amounted to \$74 per cow, and the cost of mill feed, &c., was \$18 per cow, making net returns of \$56 per cow. No charge, however, was made for pasture, or hay, or anything produced on the farm. On the other hand no credit was given for a few calves reared, milk and butter used in the family, and the sour milk fed to hogs. I find that I can *easily* keep a cow to each five acres of land, which would give a clear profit of \$11 per acre for my land."

About a year later, under date of January 9th 1884, he again wrote:

"I have been engaged in a dairy here for the last six years in a small way, having kept from five to twenty-five cows. I was also engaged in a dairy in western New York when I was a boy. It was always said there, that it required five acres of land per cow; but here in Union county I find I can keep a cow to each three and a half acres. The advantage here is, we can raise forage crops that cannot be grown there. Rye can be sown in August and pastured in November and December, also in the spring, and then by

plowing up the ground and sowing German millet, a crop of from two to four tons of hay can be cut. Millet can be sowed early, and two crops can be grown from the same ground, but of course that will exhaust the land. Cow peas can be sowed in July, and will produce from twenty to fifty tons of green feed per acre, and they come during the drouth of September. Cow peas have no superior and but few equals for a green feed for cows, being very rich, and they do not exhaust the land like corn, and if sowed early, two crops of them can be raised in a season, and if fed on the ground while green they will never exhaust the soil.

"If the dairyman is raising garden vegetables for the northern cities, he can follow his sweet corn, tomatoes, cucumbers, melons, onions, etc., with either millet or cow peas to feed green, or turnips for a winter feed for calves.

"I frequently hear the question asked—where is to be our market? In answer, I will say that this county does not produce enough now for home consumption, for the grocers all keep northern-made butter for sale at all times. The Insane Hospital also imports five hundred pounds each week. A commission merchant in Memphis, Tennessee, once wrote me that he could sell 1 000 pounds of butter per week if I would furnish it to him. By using a refrigerator-car packaged butter can be shipped to Mobile and New Orleans with the best results."

Probably the oldest dairyman in this part of the state is Mr. E. G. Robinson, of Anna, but who is now out of the business. His practical knowledge of dairying in Southern Illinois is worthy of careful attention. He writes as follows:

"It was thought a few years ago that it was impossible to make good butter here in the summer, and good butter at any season was an almost unheard of thing. Behold how altered! Now a number of our dairymen ship butter to Cairo, where it commands a good price, and if the business was enlarged we could easily supply Memphis, and place our products in that market in prime order. With proper facilities butter can be made as well in summer as in winter, and in winter as well as in summer. In winter it lacks the beautiful color which green grass alone can give. With the aid of art a yellow tinge can be given, which rightly applied improves its appearance, but, like paint on the cheek of the maiden, cannot compare with the lovely tint that God and nature gave. A supply of water at a temperature of about 54 deg. is a prime necessity. A spring, if convenient, if not, a well near the house with a windmill pump will afford every requisite. Our many agricultural journals have so fully described the various methods of raising cream in water that I can add nothing new under that head. Butter, to be good, must be thoroughly worked, and to do this took all the strength the dairywoman possessed. Invention has come to her aid, and that formerly so laborious is now, by the aid of the butter worker, no longer to be dreaded. Butter only partially worked weighs heavier by the amount of buttermilk left in it. When fresh it may look and taste well, but in a very short time it becomes rancid and only fit for grease. The dairy that adopts this plan may gain a little in weight, but never can command the top price for its products. Many salt butter by guess, therefore it can never be as it should,

invariably the same. Ascertain what your customers' taste requires, then have a fixed rule. Weigh the butter and salt, it will be found more satisfactory and certain than to salt by guess. The question is often asked, which is the best breed of cows for the dairy? Here doctors disagree. Some advocate the little Jerseys, others the milk Durhams, some Holsteins, and so on *ad libitum*. The old saying, 'that a good horse cannot be of a bad color,' holds good as regards the cow. One of the best milkers I ever owned was a cow from Pope county; an abominably homely native cow. She formerly belonged to one of my hired men, who seldom fed her, made her take 'pot luck,' or steal, for her living. She got very poor, yet I noticed he had plenty of milk and butter. It took me some time to realize that a creature that looked so badly could possibly be so good. One great advantage of the larger breeds is that when dry, or age has impaired their value, more is realized from the beef, and this is an important factor.

"I do not think the difficulty in obtaining men who can milk well is as great as it was a few years ago. Then almost every young man seemed to think it derogatory to his dignity to milk a cow, but with Platonic serenity allowed their mothers to take the pail, trudge through mud, manure and storm, to squeeze a few pints from a shivering cow. A good milkman is generally good in other respects. He is a quiet man, not given to loud talking and profanity. Gentleness should be the rule in a dairy; any unusual noise or excitement tends to make cows nervous and hold up their milk. An unruly heifer will sorely try one's temper at times, and unless a man can use self-control he has no business to attempt to milk. If so unfortunate as to have a kicker, *don't kick back*. A strap buckled tight in front of the bag and across the small of the back, will destroy the ability to kick with violence. But if all remedies fail, let the butcher try his luck. Care should be taken to get cows adapted to the business. If to sell milk, the cow that is the deepest milker is the proper animal, but if butter is the object, quality must be the criterion.

"In conclusion I would say that the person who wishes to excel in butter-making should cultivate the virtue of modesty. Do not fancy your butter is the best because *you* made it. Yet that is a very prevalent idea among farmers. If your neighbor gets five or ten cents a pound more than you, do not fancy it is from affection that the storekeeper or consumer pays it. It is simply because it is a better, more saleable article. It must not only be a prime article, but it must be in the most inviting shape. It must bear the mark of neatness and care. Who does this will soon find a market and a satisfactory price."

Another one of our butter-makers is Mr. Wm. Kratzinger, president of the Southern Illinois Fair Association. He is an observing, painstaking dairyman, and therefore successful. He writes as follows:

"I have been engaged in dairying in a small way for nearly four years, and during that time I have kept from nine to twelve cows. I have tried to make as good butter as is made anywhere, and to produce as much as possible from the cows. Starting with the best native cows I could get, I found some very good ones among them. Have two of them now, and have tested them several times. One will make one pound and thirteen ounces, and the other one pound and eleven ounces a day, for three to four months after being fresh in milk. However, the Jerseys are my choice for butter stock. I have two registered cows and one bull. Have not tested the cows fully, but am satisfied with the quantity and quality of the butter.

"To the question, 'Does dairying pay in Southern Illinois?' I say, 'It does, if it is carried on in an intelligent and business-like way.' The only trouble is there is so much poor butter made that it keeps the price of real, first-class butter down. Our home market is good, and Cairo is also a good market, but during the latter part of April and the months of May and June, the markets are overstocked. Every farmer at that time has butter to sell, and our home merchants ship their surplus to Cairo. The quality makes no difference, it all goes, good, bad and indifferent. I have seen tubs of butter sell as low as seven cents. As soon as hot weather sets in this indiscriminate butter making and shipping stops, and prices go up again. The reason

of this is, a great many farmers have no place to set milk and keep it cool enough for the cream to rise, and ice to keep their butter hard is out of the question outside of town, as we seldom harvest ice here that will keep all summer; but there are hundreds of farms in this county which have good, cool springs upon them which will do very well in place of ice. The temperature of our spring is from 50 deg. to 54 deg. Fah., which is cold enough for all dairying purposes, if you build yourself a spring house. The water which runs through my spring-house is about 52 deg.

"I set milk in deep cans that I had made to my order. The rim of the cover fits over the outside of the can so that the condensed water does not run into the can.

"My cows have averaged in the four years \$67 a piece each year. This is the net proceeds of butter sold. The milk, cream and butter we used we have no account of. I also raise all the calves on the skim milk, so you can credit each cow with about \$10 more, making in all \$77.

"Now to the cost of keeping. The grain, hay, fodder and pasture—all the cow eats—I charge her with the same as if I had to buy it, and I think it amounts to all of \$50 each, leaving about \$27 to the credit of each cow.

"I ship my butter to a retail grocery house in Cairo, where I receive the retail price of butter less 12 per cent. commission. I have had offers for my butter by the year, if I would take three cents a pound above the highest quotation of Elgin creamery each week. This is about what the commission and freight would be, but I do some better.

"The counties of Union, Jackson, Johnson and Pulaski, are not well adapted to creameries. First, our country is very broken, and the roads are rough. Second, our summers are very hot, and this would make cream gathering very expensive and rather damaging to the quality of the cream, but as I said, we have plenty of good, cold springs that are suitable for dairying purposes, and the business could be made to pay well. If we could have refrigerator cars run on certain days, say once a week, from Centralia to New Orleans, we could take advantage of the Southern markets, and as dairying in Southern Illinois increases, this may be done.

"The question of what to feed to obtain the best result, is an important one. Our pasture here is mostly a mixture of red-top, blue-grass and white clover, and is a very good early spring and late autumn pasture. During part of July and August and September, our pasture, owing to dry and the weather which generally prevails, is not good, and cows do not do as well those months, as they should, except when you feed, or have clover fields for them to run in. For my part, I do not like to feed much clover, either by pasturing or as hay, if I want to make butter, as I do not believe clover will make as good butter as timothy or corn fodder. Three-quarters of the "roughers" (as it is called here) I feed, is corn fodder. I cut most of my corn when ripe enough to be safe, and put it up in shocks of twelve bills square; after it has stood long enough for the corn to mature and the stalks to dry out enough so it will keep, I have it husked out, and the fodder tied into bundles. I use rye straw, tying it twice, near the bottom and also at the top of the bundle, and it is then easy to handle, and will pack close together. I haul and pile all I can under sheds and in the barn, the rest I put in large shocks, convenient to the barn, and tie them as well as I can, near the top; I use that first. I also sow rye among my corn, which I generally do the last time we cultivate the corn; it does no harm to the corn, but is rather beneficial, as it keeps the ground shaded so it will not dry out so rapidly as it would if bare, and thus I have a good fall and winter pasture for my stock. I have the corn fodder run through a cutting box before feeding it, and the corn I have crushed, cob and all. I feed four quarts of this, two of bran, and two of shipstuffs or ground oats to each cow, morning and evening, in winter. During summer I cut down this to about half the amount, and increase again as pastures fail."

In conclusion we would simply say that there is an earnest and growing interest in dairying and improved stock raising, throughout Southern Illinois, and the prospects are that much will be done the coming year to entitle us to a higher position on the dairy ladder.

Convention adjourned *sine die*.

